WESTERN GAS

March
1932

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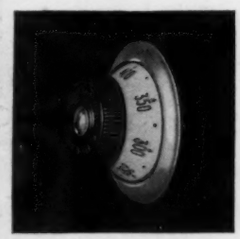

The Milwaukee Gas Specialty Co. Laboratories invite you to send them one of your ranges for a free installation of the Thermolator. Send it today.

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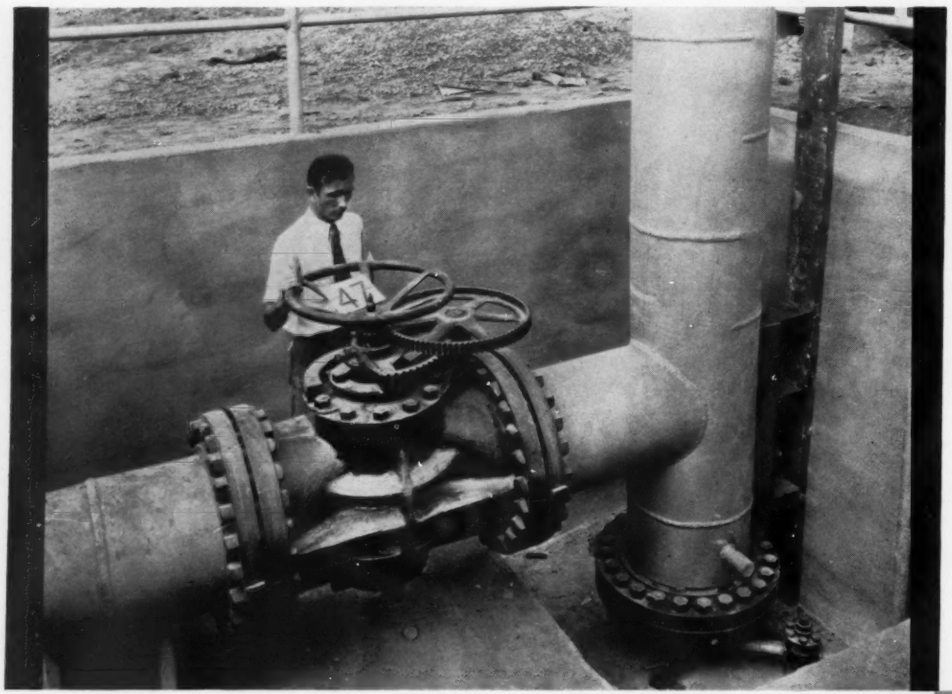
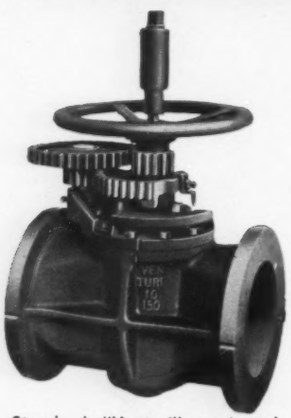
A MONTHLY JOURNAL DEVOTED TO THE
WESTERN GAS & APPLIANCE INDUSTRIES

NORDSTROM VALVES

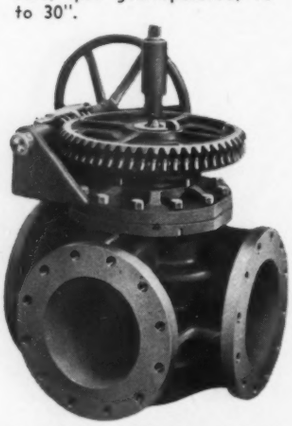


20" 500-lb. Nordstrom "Venturi" Valve at terminal of transmission line.

THE PERFECT APPLICATION OF A PRINCIPLE



Standard "Venturi" semi-steel valve, 150-lb. working pressure, spur gear-operated, 10" to 30".



Standard 3-way Valve, 150-lb. working pressure when used in the "positive position." Worm-gear operated.

The most positive Seal mechanically possible

Adoption of Nordstrom Valves gives to the pipe line an absolute shut-off and freedom from leakage internally or externally. This is due to the patented "Sealdport" lubrication and other exclusive Nordstrom principles. Nordstrom "Venturi" Valves are stream lined in such a manner as to effect the least restriction of flow. Ask for Catalog No. 8.

FOR ALL VALVE SERVICES ON PIPE LINES FOR GAS TRANSMISSION

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SUBSIDIARY OF THE MERRILL COMPANY . . ENGINEERS

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Agencies:

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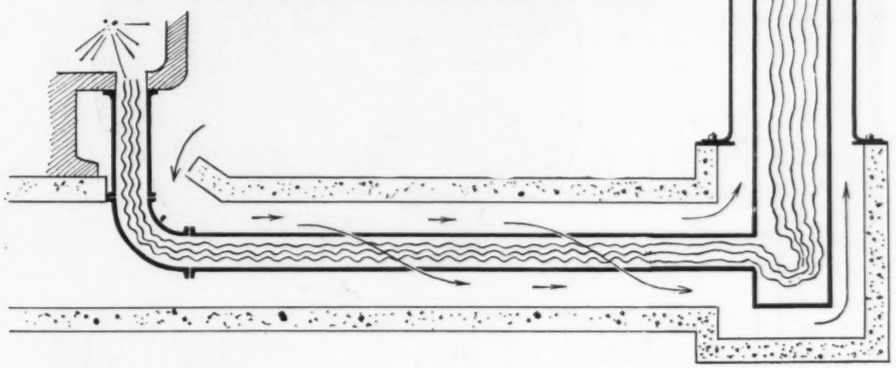
Quiet Operation Features This Advanced FLUOR Muffler



A baffling arrangement in the muffling pot insures quiet operation. This new Fluor muffler may be utilized as an overhead muffler as it is easily adapted to the overhead type of exhaust. This type of installation is lower than others in cost.

Maintenance charges are automatically reduced when these air-cooled new type mufflers go on the job. Water scale in exhaust lines is eliminated; exhaust pipes remain clean, minimizing possibility of breaking. No water spray ejected, reduces corrosion and costly maintenance on near-by buildings and equipment. Stack paint wears longer due to cooler stack temperatures. Engine foundations remain cooler. Engine room ventilation is greatly improved.

In your search for more economical mechanical equipment your judgment will prompt you to investigate the new Fluor Air Cooled Muffler. Folder material and data available on several field installations will be sent upon request . . . And Fluor Engineers are always available to assist you with mechanical problems.

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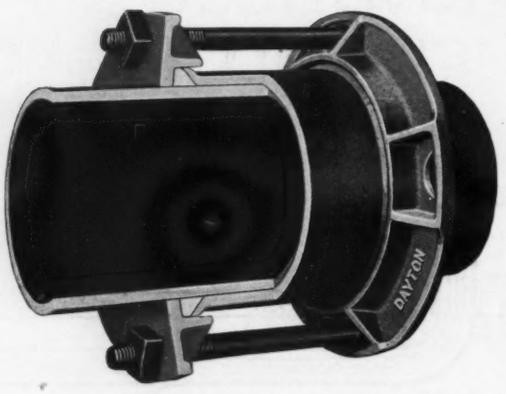
11 East Fifth Ave.

March, 1932, Volume VIII, Number 3, Western Gas is published by Western Business Papers, Inc., at 124 West Fourth Street, Los Angeles, California. Subscription price (in advance) 20 cents the copy; $2.00 per year; 2 years, $3.00; $3.00 per year foreign. Entered as second class matter June 1, 1925, at the postoffice at Los Angeles, under the Act of March 3, 1879.

DAYTON
NO. 3 COUPLING



Used to provide a flexible joint in the line with ample allowance for expansion and contraction.

Center ring is made of heavy steel tubing and flanges of certified malleable iron, with special through-bolts.

Sizes 2½ to 5 inches

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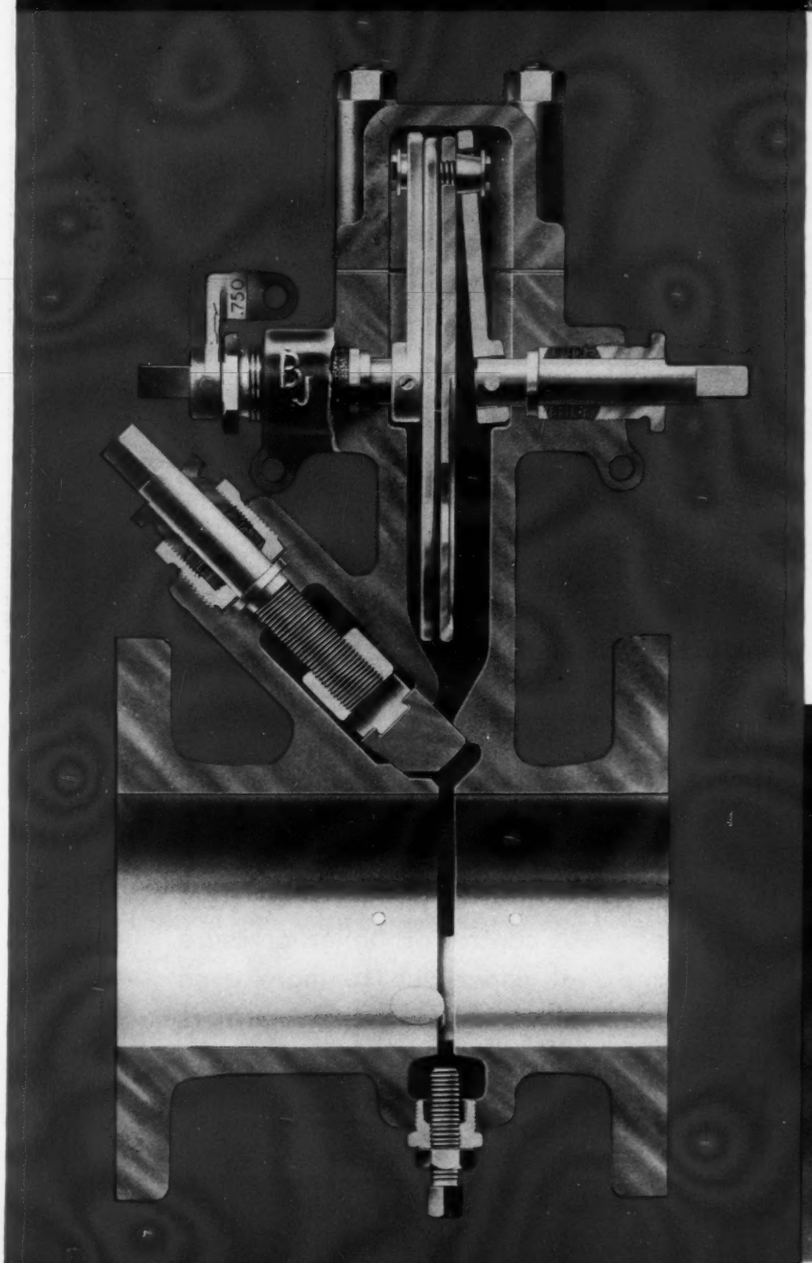
Announcing THE BJ DUPLEX ORIFICE FITTING

with these NEW and IMPROVED ADVANTAGES



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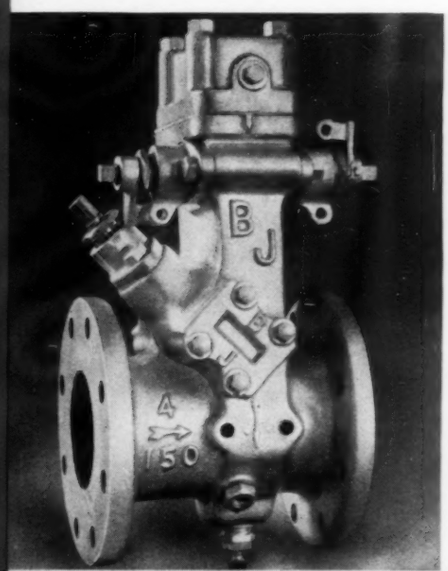

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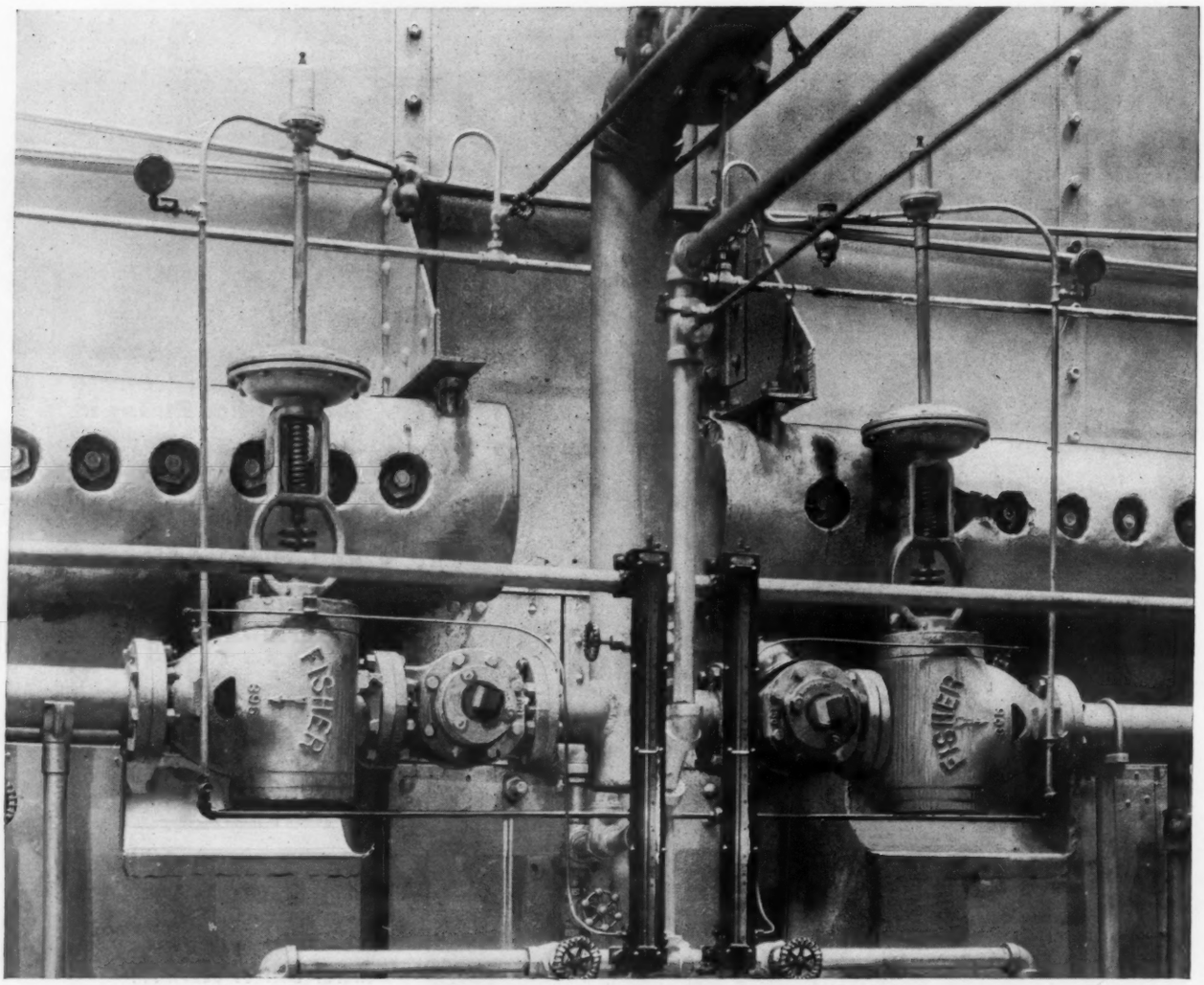

FISHER Type 520 Boiler Gas Fuel Governors with Streamline Bodies

You Can't Make Good Paper by Hand

The above FISHER Boiler Gas Fuel Governors replaced hand-fired methods in a large paper mill. ❖ RESULTS: Real savings in gas consumption; accurate control of boiler pressure which produced a better grade of paper due to more even steam pressures throughout the mill. ❖ FISHER Governors can be adapted to all types of gas-fired boiler installations.

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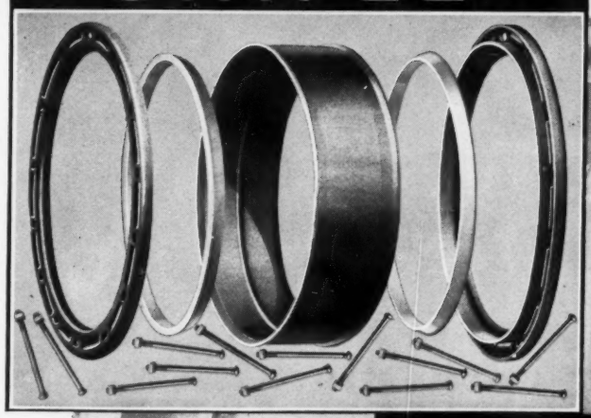

IT'S so easy to join two lengths of pipe with a Dresser Coupling . . . the job's done almost before you can describe it! A flange and a gasket slip over each pipe-end. The middle ring goes in between. Then these parts are moved together. The bolts are inserted and drawn up evenly all around. And there you are! You have a joint that will remain absolutely and permanently tight for the life of the pipe. Besides promoting rapid laying of permanent lines, Dresser Couplings are equally advantageous for temporary installations. They can be easily taken up and re-established elsewhere with practically no loss of material.

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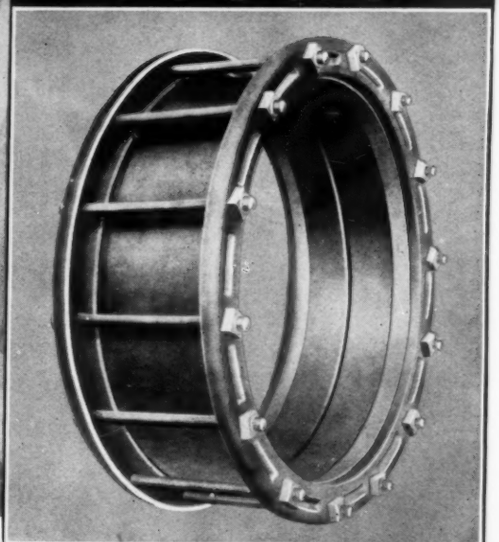

Wherever a big gas main or a long-distance line is laid in record time . . . or wherever the going is rough or the need for strong, flexible, durable joints is imperative—Dresser Couplings dominate. "Dressered" lines provide for all movements due to expansion, contraction, shifting ground, vibration and other strains. Maintenance is nil.

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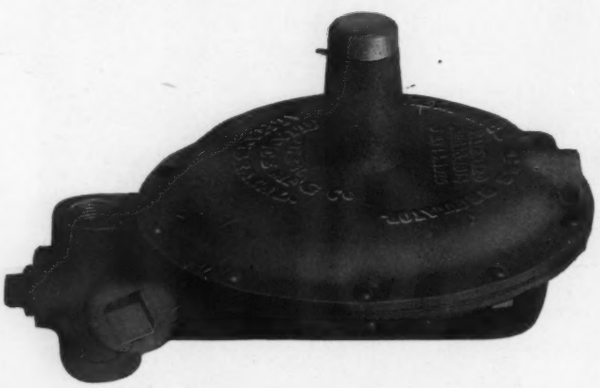

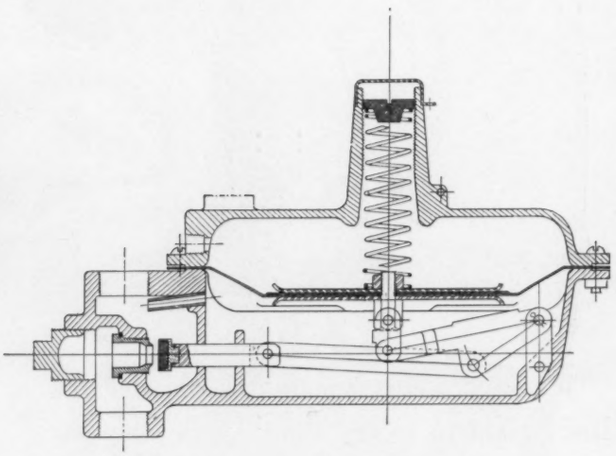

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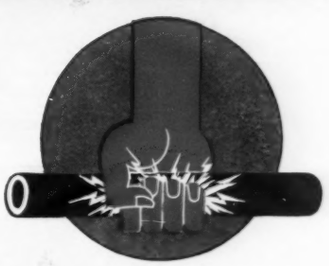

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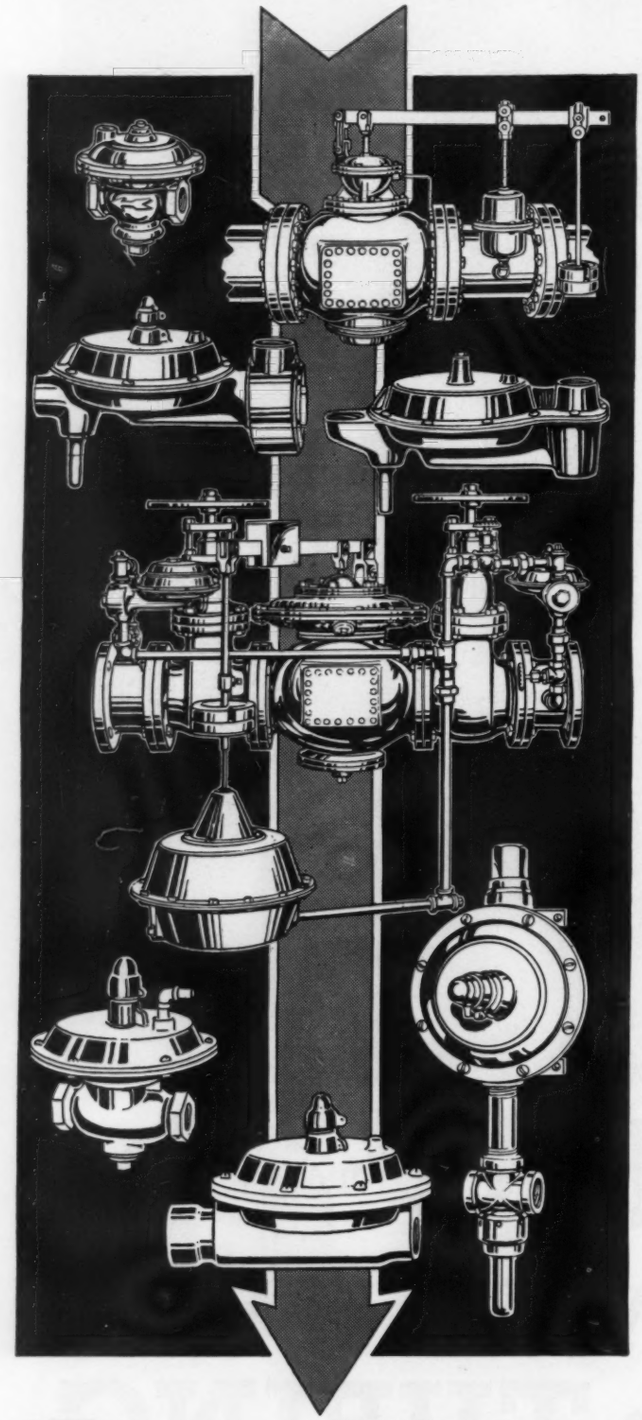
As long as there is a need for gas control regulation, just that long will the name Reynolds be symbolic of dependable, accurate gas control



Reynolds manufactures a complete line of Gas Control Regulators, from high pressure (650 pounds) to low pressure, inches W. C. All units are factory tested after assembly for performance through a complete range of possible conditions. All materials used in the manufacture are a-number-one quality. Every part of any Reynolds unit is pre-inspected for strength and accuracy before reaching the assembly line.

Reynolds Gas Regulator Company's 40 years of leadership in the field is proved by the hundreds of thousands of Reynolds Regulators that are still giving satisfactory performance after years of service.

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ON a 26-in. California natural gas line, each welder averaged 12 to 14 Lindewelded joints a day, in spite of scorching heat and rough mountain country. Every joint tested strong and tight.

This record is by no means exceptional for this Process.

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For pipe line builders who want greater speed at lower cost, Linde Process Service has developed procedure controls for Lindewelding. These are offered to all Linde customers without charge. Our nearest district office will be glad to give you all the details.

See Every step in making a Lindewelded Joint

Lindeweld technique differs from neutral flame welding technique in that it employs a special rod, a special flame adjustment, and the "backhand" method of blowpipe manipulation. Our motion picture, "The Lindeweld Process for Pipe Line Construction," shows the actual steps in making a Lindewelded joint. Pipe line officials and welding or engineering societies may borrow this picture free of charge. It is furnished in 16 mm. and 35 mm. safety film and can be obtained by writing to any Linde District Office.

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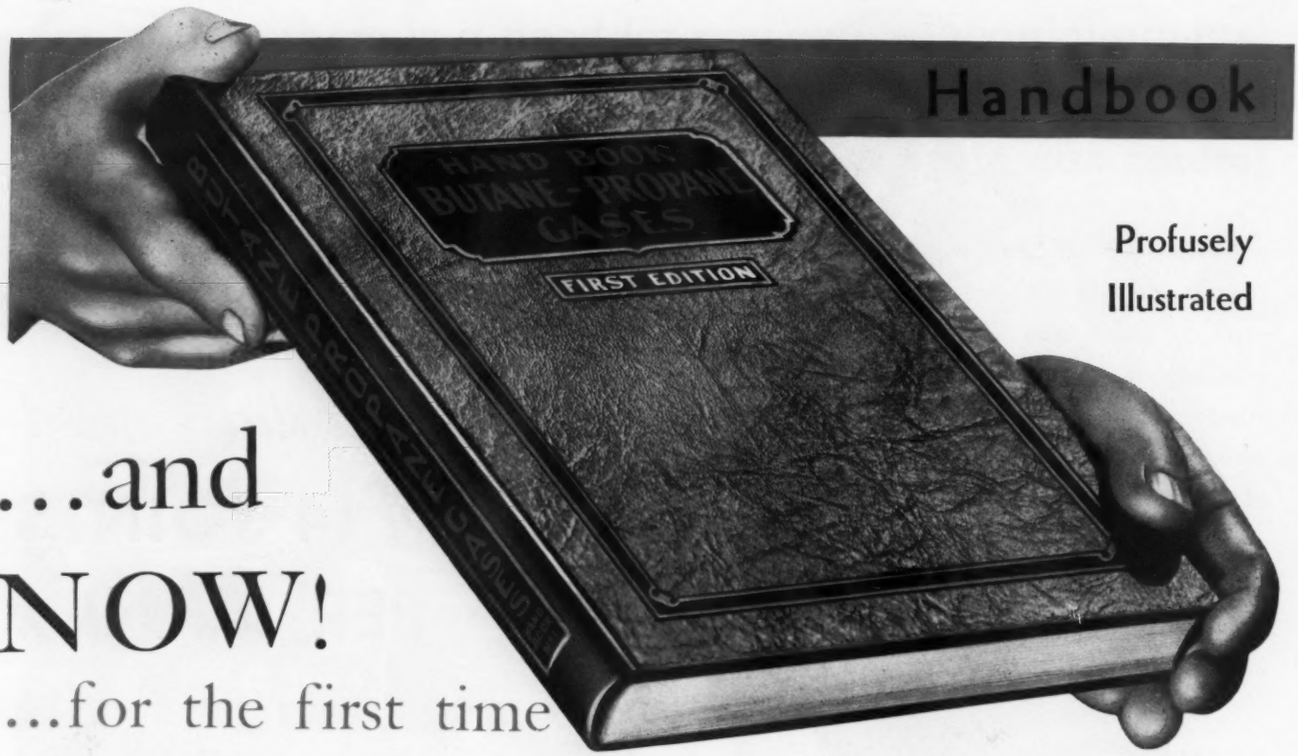

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A Complete Reference Work on BUTANE PROPANE GASES

THIS Handbook comes in response to a very definite need. A tremendous amount of development work has been accomplished for the liquefied petroleum gas industry in a brief space of time, with many companies participating. And to date there has been no one source to which the industry could go for information on all phases of the field. This is the mission of the *Handbook of Butane-Propane Gases*—consolidating and organizing all of these reference data under one cover.

Through the regular publication of "Butane-Propane News," a monthly feature of WESTERN GAS, the editors have established close contact with all branches of the liquefied gas industry—production, bottled gas and town plant distribution, gas enrichment—and to assure a high standard of technical excellence for the Handbook leading figures in the industry have extended their cooperation as contributors.

On the opposite page contents of the *Handbook of Butane-Propane Gases* are reviewed. No phase of the field is neglected, and every major subject heading is treated in detail, making the Handbook an outstanding reference work. It is fully illustrated, with numerous tables and charts.

Advance orders for the Handbook have poured in from all sections of the United States, and from several foreign countries, since the first announcement two months ago —indicating again the need for this publication and the growing interest in butane-propane service. A limited printing makes it imperative that you place your order now (send no money). Use the coupon on the opposite page.

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(a) History: Highlights in development of bottled gas, central plant, industrial, and enrichment usage.

(b) Present and Potential Scope of the Industry: Statistics on marketed production; available supply; number of central plants, bottled gas distributors, producers; number of gas companies enriching; future field of expansion for bottled gas and central plant service, as well as other forms of liquid gas utilization.

PHYSICAL PROPERTIES:

Vapor pressure curves and tables; tables of constants for hydro-carbon series; proportioning curves, etc. A section made up of basic reference data, with liberal use of curves and charts.

PRODUCTION OF LIQUEFIED PETROLEUM GASES:

Sources for liquefied petroleum gases; the natural gasoline extraction process; refinery gases; dehydration; mixes for gas enrichment, industrial plants, bottled gas, and town plant use under various temperature conditions.

SAFETY REQUIREMENTS:

Presenting in convenient reference form pertinent regulations of the Bureau of Explosives, Underwriters' Laboratories, Compressed Gas Manufacturers Association, National Fire Protection Association; approved field practices for handling, storage, etc.; design of containers.

TRANSPORTATION:

By tank car, motor truck, pipe line, water; design of transportation equipment; traffic requirements; freight charges.

APPLIANCE UTILIZATION:

Appliance design and adjustment for operation on liquefied petroleum gases; combustion characteristics; fuel consumption of various types of appliances; appliance efficiencies on butane-propane, compared to other types of gas.

USE IN GAS MANUFACTURE:

Plant design and operating practice for enrichment of oil gas, water gas, coal gas, etc.; reforming and cracking liquid gases.

CENTRAL PLANTS:

Design of plant and distribution system for both air-butane and undiluted vapor types; measurement and other operating problems; town survey; sales organization; rates and billing.

BOTTLED GAS DISTRIBUTION:

One-drum distribution; two-drum distribution; bulk stations; sales organization; rates and billing; utility co-operation on bottled gas sales; competitive fuels; combining central plant and bottled gas service; railway, marine and other special installations.

INDUSTRIAL USES:

Comparative costs of liquefied gases, coal, oil, manufactured and natural gas; description of plant lay-outs for industrial use of liquid gases; conversion problems in changing from other types of fuel to liquid gases; present and potential field for industrial use of these products; application of liquid gas to various industrial processes.

SPECIAL REFERENCE FEATURES:

(a) Directory of central plants, listing the towns served (with town population), date, service began, type of service, type of distribution system.

(b) Directory of bottled gas distributors.

(c) Catalogue Section: Detailed specifications of equipment and appliances designed especially for this industry.

(d) Index: Cross-referenced by subjects and authors.

(e) Buyers' Guide: A commodity directory of appliances and equipment, with names and addresses of all manufacturers serving the industry.

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"Publishers," 124 West 4th Street
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Figure your street openings at $50 each . . .

Then figure what Byers Pipe would SAVE you a year!

A middle western gas company dug after 51 leaks in 5 days recently!

Even though it required but one hole to locate each leak—just the hole-digging and hole-filling cost plenty! The engineer in charge of the work estimated $50 per hole—$2550 in 5 days, not to mention the cost of leakage or the cost of pipe or wrapping!

Is it any wonder that gas companies are evidencing an ever-increasing trend toward the use of Byers Genuine Wrought Iron Pipe?

Byers offers tight screw joints that stay tight when soil shifts or heaves. This feature plus the record of Byers Wrought Iron provides gas pipe services unequaled in fighting soil corrosion.

The railroad industry, too, buys Byers Wrought Iron Pipe because of its established service records.

Call in a Byers representative and get the facts that back up Byers Genuine Wrought Iron. This year of 1932 demands the kind of strict economy that Byers records prove for Byers Pipe! A. M. Byers Company, Pittsburgh, Pa. Established, 1864.

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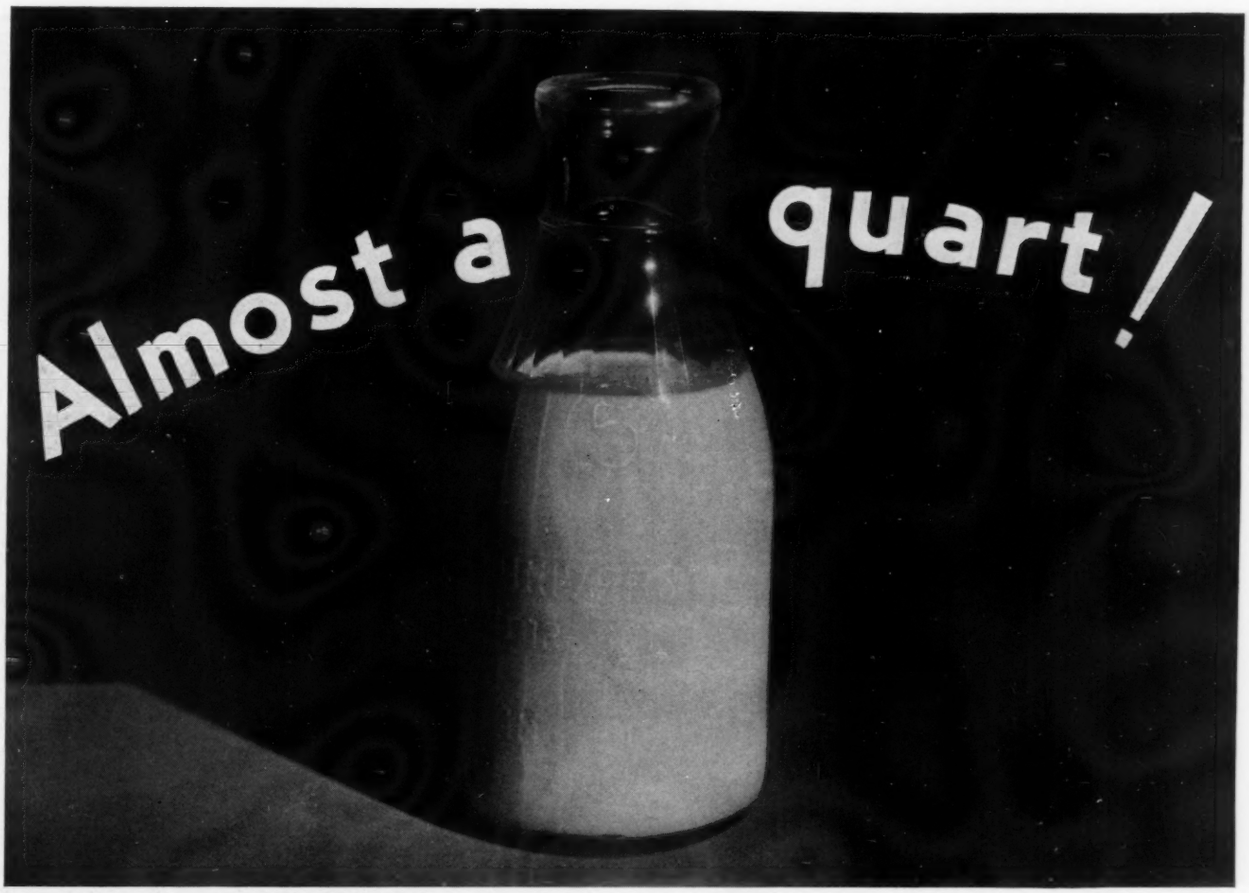

But It Won't Bring A Quart PRICE!

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Reliable, accurate meters are necessary in gas measurement. To be reliable a meter must STAY accurate over long periods. It must stay accurate without TOO frequent checking.

Because of its Straight Line Motion the Foxboro Orifice Meter will maintain its extreme accuracy LONGER THAN ANY OTHER and its maintenance cost is the lowest. We stand ready to prove this any time and any where.

If you buy or sell gas, our new bulletin, "Orifice Meters for Gas", No. 176-J, should be on your desk. Write for it today.

The Foxboro Orifice Meter

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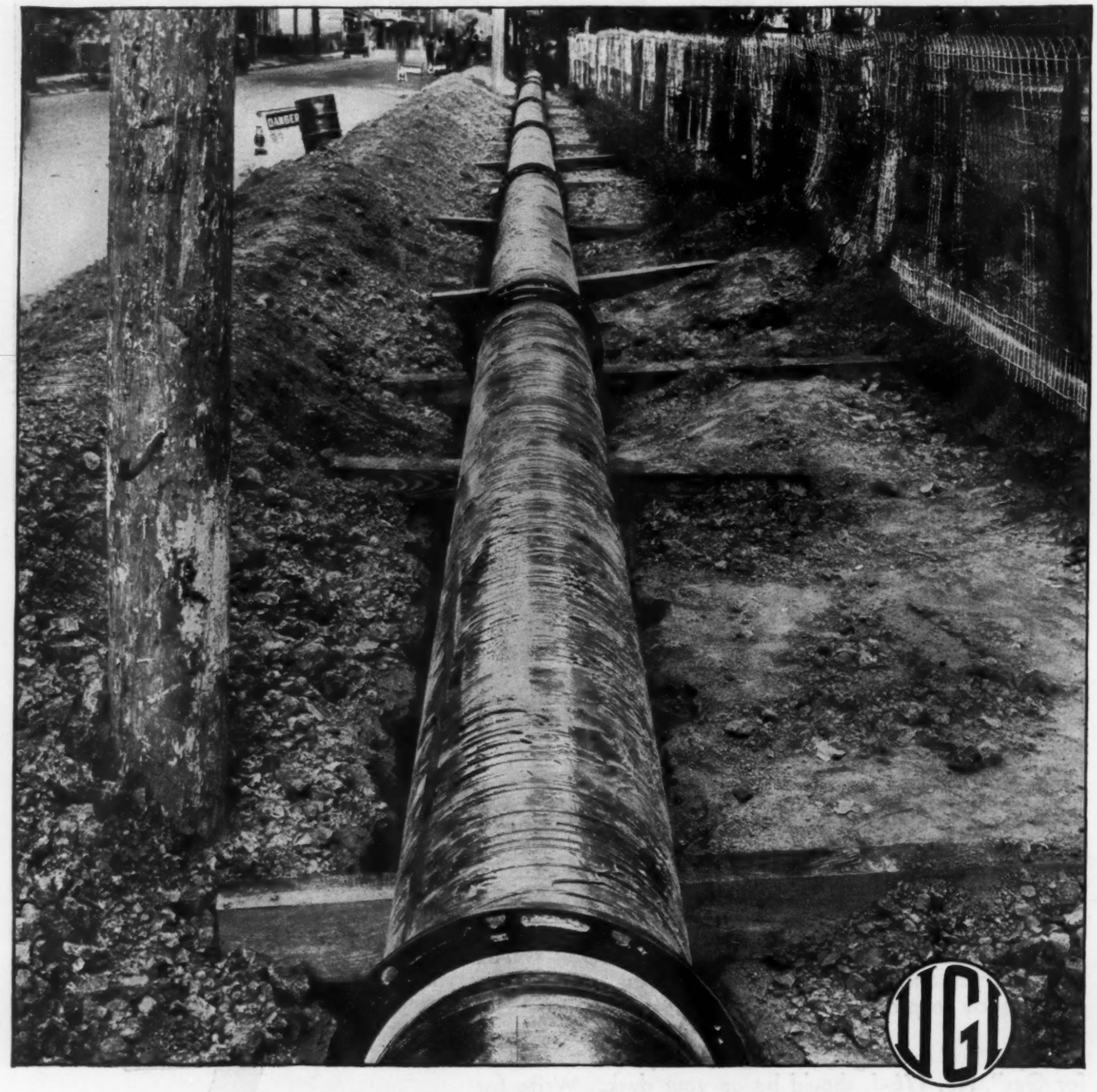
Instruments for Controlling, Recording, and Indicating Temperature, Flow, Level, and Pressure

PIPE LINE CONSTRUCTION

anywhere—under any conditions



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12 miles of cast iron pipe with
MECHANICAL JOINTS
for a high pressure gas line

THE above photograph was taken during the recent installation of a 12-mile section of a cross-country high-pressure natural gas transmission line.

Specifications called for 6-inch cast iron pipe with *mechanical joints*, subject to 400-pound pressure field test. The joints used are based on the "stuffing-box" principle employing rubber gaskets with follower rings.

The "stuffing-box" principle is embodied in several mechanical joints made by members of The Cast Iron Pipe Research Association. Tests and installations have demonstrated that these joints are *gas-tight* under high pressures.

For further information write to The Cast Iron Pipe Research Association, Thomas F. Wolfe, Research Engineer, 309 Peoples Gas Building, Chicago, Ill.

Cast iron pipe bearing the "Q-check" trademark is obtainable from the following leading pipe founders: Alabama Pipe Company, Anniston, Ala.; American Cast Iron Pipe Company, Birmingham, Ala.; James B. Clow & Sons, 219 N. Talman Avenue, Chicago, Ill.; Donaldson Iron Company, Emaus, Pa.; Glamorgan Pipe and Foundry Company, Lynchburg, Va.; Lynchburg Foundry Company, Lynchburg, Va.; National Cast Iron Pipe Company, Birmingham, Ala.; United States Pipe and Foundry Company, Burlington, N. J.; Warren Foundry and Pipe Corp., 11 Broadway, New York.

CAST Q IRON

Look for the "Q-check" symbol as shown above. It is the registered trademark of The Cast Iron Pipe Research Association.

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When the Day's Work is Done . . .

IT'S DONE!

The **TAMPER— BACKFILLER** *keeps the front and rear of your job close together*

. . . and it's a mighty cheap form of public liability insurance

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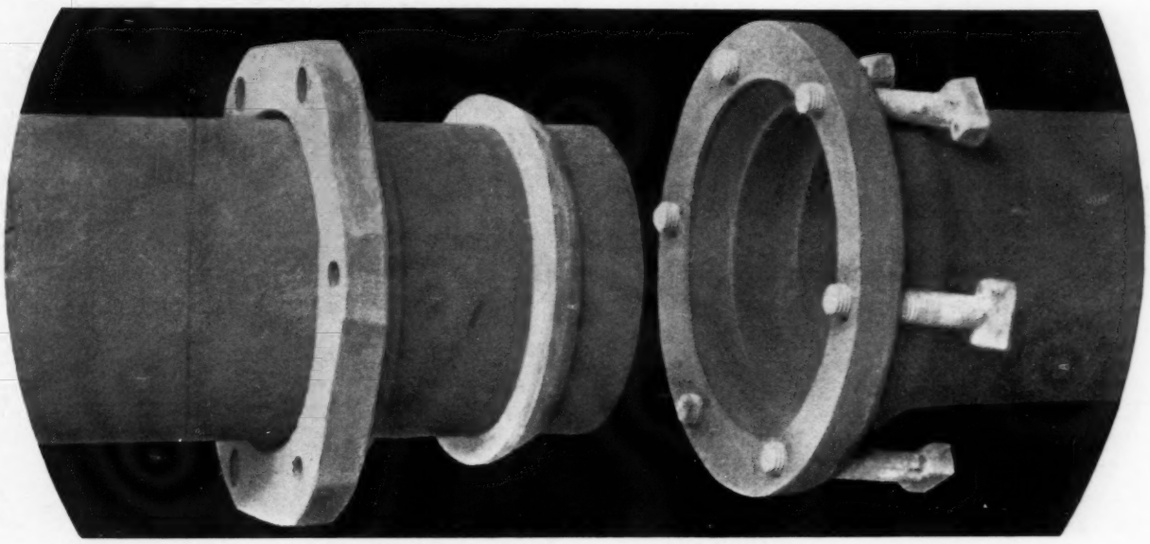

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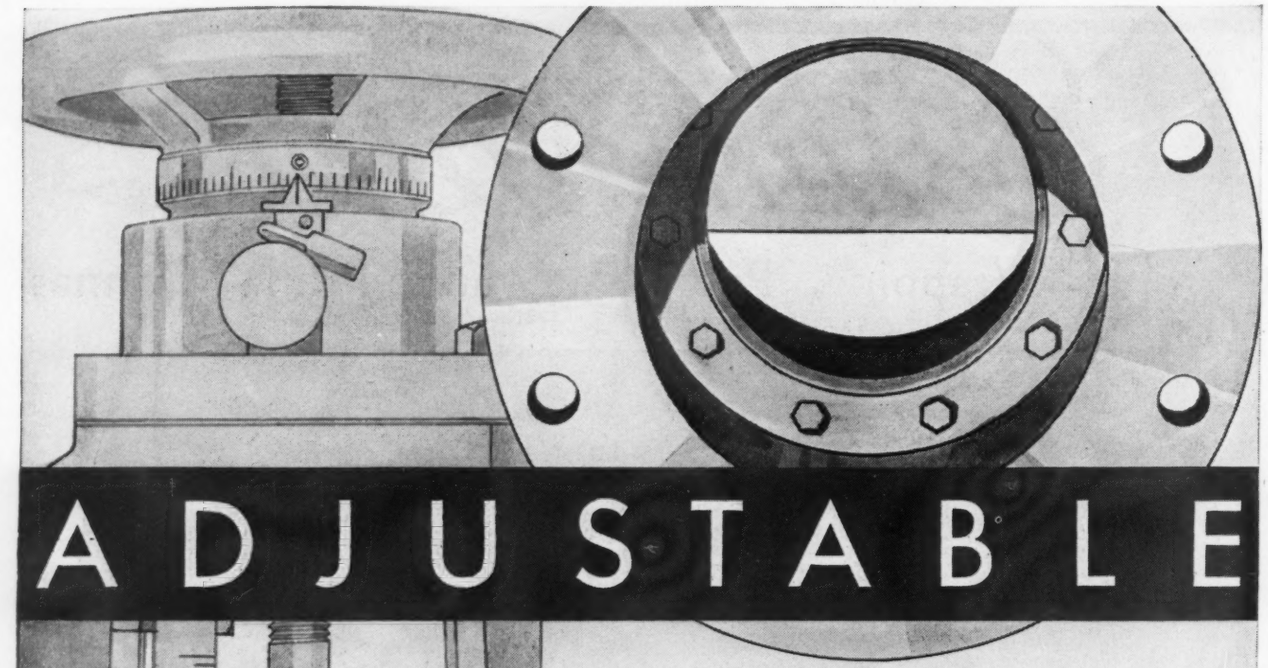

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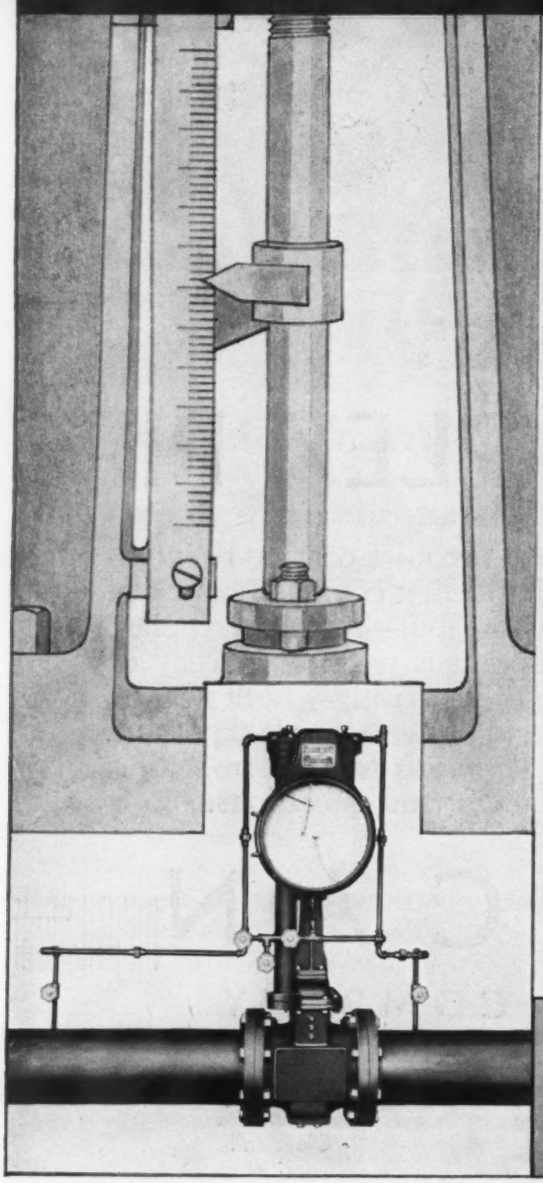

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A more detailed discussion will be found in Bulletin E-15, which will be sent on request.

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March, 1932

WESTERN GAS

"Reg. U. S. Pat. Off."

Vol. VIII, No. 3

A Monthly Journal of the Gas and Gas Appliance Industries in *Western America*

Mid-West Sales Conference

WITH an attendance of 475, or 25 more than last year, the 1932 Mid-West Regional Gas Sales Conference convened on February 17 and 18 at Hotel Sherman in Chicago. Approximately 20 states were represented in the registration. Because of the A.G.A. Manufacturers Section meeting held on the 18th, a number from that group were in attendance during the sessions.

The conference is conducted annually as an activity of the American Gas Association Commercial Section, of which J. W. West, Jr., is secretary, and represents the largest yearly gathering of sales executives in the industry.

F. M. Rosenkrans

Chairman, Mid-West Gas Sales Council

J. W. West, Jr.

Secretary, Commercial Section, A. G. A.

Addresses and symposiums on important phases of selling from the point of view of the company, the sales executive and the manufacturer were features of the program. Preparation of the program was directed by F. M. Rosenkrans, new business manager of the Gas Service Co., and chairman of the Mid-West Regional Gas Sales Council, assisted by other members of the Council.

At the opening session Samuel Insull, Jr., Chairman of the Commercial Section of the American Gas Association, brought a message on "Our Future Sales Problems."

In the pages following, excerpts from a number of the program features are presented, and other papers reviewed.—*Editor.*

Surmounting Cooking Competition

By GUY M. JOHNSON

Manager South Bend Division
Northern Indiana Public Service Company

IN determining how to hold and increase the gas cooking load, it is well to review the reasons that got us the load. For, in reviewing these facts, we will find that they are equally as true today as they were yesterday.

In the first place, we didn't get the business on a cost of operation basis. The fuels our gas replaced are today cheaper and still available. *The element of cost of operation only becomes a factor when other things are equal.* We didn't get the business on initial investment, since other cooking stoves were, and are, just as cheap as ours. On what basis, then, did we get the business? It is answered in four words. *Gas cooking is better.* The reasons why it is better are familiar to everyone. These reasons were, and still are, our best selling points.

Some of these reasons are self-evident. Speed, for example. In these days of time utilization, here is an advantage that cannot be taken away from us by any of the competition on the horizon at the present time.

The gas industry is fortunate that it has within its ranks a most progressive group of gas range manufacturers. I believe the development and popularization of the oven regulator was one of the biggest things that ever happened in the development of our business. My one comment is that the manufacturers, as far as we are concerned in South Bend, were always ahead of us and it was only when we began to realize that we were losing our load because of our failure to popularize the oven regulator, that we began to put real effort behind it. It seems almost tragic that it is only in the last few years that we have had any real public acceptance of the oven regulator on a gas range. . . Many a woman . . is solidly lined up in favor of gas for cooking primarily because of the value to her of the oven regulator.

We also have always appreciated the value of the replacement range business. In fact, in our straight gas properties, our management has established the policy of grouping our gas range sales under our new business activities, whereas, in our combination properties, we consider them merchandising. And so, looking at the replacement range business, we know that every present user of a gas range, who purchases a modern, up-to-date gas range, besides giving us an immediate increased load of 38 therms annually, has also committed herself to cook with gas for the next 10 years. The replacement

range being so valuable, it is necessary, therefore, for us to see that she gets the best gas range possible according to her resources, and in consequence we have never compromised with quality. As a matter of fact, we could retail the highest quality gas range with a very adequate mark-up and still have plenty of margin to spare over our alleged competitors, and by competition I don't mean the dealers who are selling gas ranges. They are not our competitors, they are our valued allies and in establishing our own high quality retail standard, we took particular care in organizing our retailing operation, to give these dealers an opportunity to get into the gas range business with us at a profit and at the same time gave them a quality goal to shoot at. It has always been a theory of mine that the cheap gas range retailing for impossibly low prices, without the oven regulator, insulated oven or efficiency of design is a far greater menace to our cooking load than any offered by our competition. The cheap range is inevitably a product of intensive, uneconomic competition and, as far as our own retail operation is concerned, we have by precept and example done all we possibly can do to discourage it.

The question of keeping the cooking load is entirely one of merchandising technique, for, to hold and increase it, gas ranges have to be sold. I have already mentioned the importance of the oven regulator. There are other developments, from a merchandising view-point, that are equally significant. The organization and institution of the A.G.A. Testing Laboratory in Cleveland is another selling point of which we tried to take full advantage. While we realize the real merits of the Blue Star Seal of approval, there is no question in my mind that it has definitely raised the standard of gas ranges sold. We spent a lot of money advertising the Blue Star and I feel that by impressing its significance on our customers we built a better dealers' standard and at the same time won a further degree of public confidence in gas cooking. As other improvements came along we aggressively tried to take full advantage of them, because every improvement means obsolescence in some way or another and the life blood of all merchandising is obsolescence. The insulated oven? What a sales story we had with that! And then came the new beautifully designed consoles and table models. All of which, is excellence from a merchandising viewpoint and every improvement something on which we could build further aggressiveness in selling gas ranges. Finally, today we have the completely automatic gas range with time control, if desirable, and with it, our case for gas cooking is complete.

The pity is that merit alone is not enough, and self-sufficiency and complacency because of our obvious superiority in the cooking field, are apt to prove our undoing unless we realize our story is always new to our customers and that it is our duty to keep telling it patiently and enthusiastically.

You often hear the question of cost of operation raised. Earlier in this paper, I said that the cost of operation is not a factor unless other things are equal. We are going to hear a lot more—we have already heard a lot to date—about the relative overall thermal efficiencies of the various fuels. Our electric competitors, because they do enjoy a better rating in this respect than we do, are going to make a play with this. Already, I have seen a document issued by one of the leading electric range manufacturers, particularly emphasizing the fact that the electric range has an overall thermal efficiency of 83.3 per cent, compared with gas at 51 per cent. This manufacturer quotes a Purdue University bulletin as his authority, but for the purpose of comparison and assuming that all other things equal, it is not the thermal efficiency but the cost of operation that definitely counts where general usage is concerned. . . . In fairness to Purdue University, let me say, that our electric friends only told half the story. I dug up a copy of the Purdue bulletin and in it I see a companion test to the thermal efficiency test which shows with these relative thermal efficiencies, that electricity at 3c a kilowatt hour was about twice as expensive for cooking as 570 B.t.u. gas at $1.50 per thousand.

In South Bend, last year, we started a plan of taking in electric ranges. Our management stipulated that only a certain minimum of electric ranges could be taken in, this number to be determined by the rate at which these electric ranges could be resold on our rural electric lines. A certain quality and definite standard of conditions were stipulated. The company breaks even on the proposition from a merchandising view-point and because of an accessible market for the electric ranges within our company system, it is a good double-barreled load building plan. Incidentally, we can take them in much faster, so far, than our rural electric properties can absorb them.

An analysis of the reasons why people are anxious to get back to gas cooking brings out very definitely that our talking points are sound and that cost of operation is a factor in meeting such competition. Cost of operation is determined by the rate structure. Only recently, we had an apartment house change over from electric to gas cooking because the owner couldn't rent his flats, while electric ranges were there.

In our South Bend Division we have service charge domestic rates which are decidedly promotional in form. Gas for water heating is cheap because the customer uses gas for cooking. The customer is encouraged to use gas for all purposes in order to reduce his unit cost of operation on each. This is a factor of primary importance and I would say from our experience, that the best weapon of all to lick competition is a good promotional initial use of service charge rates. Another good way too, is to go after and get as big a water heating, home heating and refrigeration load as possible on the same rates, for every satisfactory use of gas in the home helps sell all the other uses for it.

Why *a* Combination Utility Sells Gas Refrigeration

By D. D. MERCHENT

Valparaiso District Manager,
Northern Indiana Public Service Company

THE average gas system is 50 per cent or more larger than the demand placed on it. In those territories where a gas high in calorific value has been introduced, this condition is magnified even more. We therefore have a large capital investment with a relatively low return on it. A gas refrigerating unit will add 12 therms to the present domestic customer's load each month. In the Valparaiso District this would increase the present average residence revenue 64 per cent. This is certainly a goal worth striving for.

Before deciding on a policy of selling only gas refrigeration in a combination territory, our management considered the fact that the gross revenue from an electric refrigerator is greater than from a gas refrigerator. Let us forget for the moment that we do not believe we are losing much, if any, of this gross revenue. Gross revenue is not the figure in which we are primarily interested. In gas refrigeration, we are able to serve the refrigerator with the same main, service

AS a "combination" utility, the Northern Indiana Public Service Co. is not opposed to growth of the electric refrigeration load on its lines. But it sells gas refrigeration exclusively, where gas is available. In so doing the company is guided not only by a belief in the fundamental correctness of the gas refrigeration system, and its economy over the compression type system. It is also held that the electric refrigeration industry is strongly organized, with manufacturers doing an aggressive sales promotional job. The utility must do the pioneering for gas refrigeration, if it is to be done, and its emphasis upon gas refrigeration at the same time will stimulate sale of electric units through competition. A new gas use makes the public increasingly gas-minded and builds gas load without increased capital investment.—*Editor.*

D. D. Merchent

and meter. We are, therefore, obtaining additional revenue on present capital investment. This is not so generally true with electric refrigeration. There are several instances where we have had to spend considerable money to improve our distribution system so that electric refrigerators would give the proper service. In the sale of any appliance it is good to look at the effect of this appliance on your system in future years. We do not believe it stretching the imagination too far to assume a saturation of 50 per cent in mechanical refrigeration in the better residential districts. What will be the result to us in dollars and cents if this saturation point is reached with electric refrigeration? What will be the resu't with gas refrigeration? In order to answer this question I selected a typical section of Valparaiso which is served by one secondary system. I assumed that one house out of each two would have a refrigerator. I requested the cost to us, to serve these refrigerators in the event that they were all electric or that they were all gas. The report which was given to me is interesting. It would require an additional capital investment of $202 to make this electric system suitable for refrigeration. This $202 includes the cost of time and material of installing the new equipment plus the cost of retiring the old equipment, less the salvage value of the old equipment. In gas, the report was quite different. We would easily be able to serve 100 per cent of the houses rather than 50 per cent, without even approaching the condition of loaded equipment. The reason for this is very easy to determine. The average electric refrigerator has a conservative demand of 200 watts. If this were used continuously for a 30-day month it would consume 144 kilowatt hours. The average use of a domestic electric refrigerator is 45 kilowatt hours, therefore having a load factor of 31 per cent. On the other hand a gas refrigerator has a maximum demand of 2 cubic feet per hour (when using 1000 B.t.u. gas as we do in the Valparaiso District). If this unit were to operate continuously for a 30-day month it would consume 1400 cubic feet of gas or 14 therms. The average use of this refrigerator is 1200 cubic feet of gas per month or 12 therms. The load factor in this case is 85 per cent. It is apparently well worth while to consider these facts when determining which type of refrigeration to merchandise, as in one case you have additional gross revenue plus additional capital investment, while in the other you have added gross revenue with present capital investment.

Now let us assume that both types of refrigeration will give the customer equal benefits as far as refrigeration itself is concerned. Why should the public want gas rather than electric refrigeration when it is acquainted with the facts? Using 12 therms for gas and 45 kilowatt hours for electricity what will it cost the customer for his refrigeration in both cases? This of course is a local condition and I can only tell you what is true in the Valparaiso District. The average residence use of electricity is $3 per month. This is obtained by dividing the gross residential revenue for the year 1931 by the number of residential customers. It is a fact and not our estimate. The average gas residence use is $3.15. The cost to the electric customer for his refrigeration for 45 kilowatt hours per month would be $2.70. The cost to the gas customer for 12 therms after he had used $3.15 would be $2. There is of course the cost of the water to be added in the gas cost. To get an accurate analysis of the water cost I used my own refrigerator. Prior to the installation of this refrigerator my water costs averaged 70 cents per month for 11 months. Since the installation they have averaged 98 cents a month for 16 months. I can safely say then that my refrigerator is costing me 28 cents a month for water. We have then a cost of $2.70 in one picture and $2.28 a month in the other. This shows an advantage of 18 per cent in favor of the gas refrigeration. There are numbers of cases due to the rate structure where the gas costs will be as low as 50 per cent of the electric costs. We are therefore selling the public as good a refrigerator at considerably less operating expense. This is certainly good business.

How will this affect our merchandising department? There is no question that this department will suffer at first because of the decreased volume. However, we think it is considerably better business to follow the path of higher resistance and sell that appliance which will build the load along more desirable lines. We feel that the gas business needs much more attention from us in order to develop and obtain the increased load. As a result of that belief, the sales organization is better organized to merchandise gas refrigerators.

Rounding Out *the* Gas Heating Field

By JACK TORBERT

New Business Manager
The Wyandotte County Gas Company
Kansas City, Kansas

A SURVEY of any community will reflect a large number of homes that do not have central house heating installations, but which depend upon the base burner, coal stove or wood stove to furnish their heat. Such homes may or may not have basements. Many small communities in our section of the country show as high as 75 per cent of the homes without furnaces and basements.

The company with which I am connected serves a community of approximately 125,000 population with natural gas and, surprising as it may seem, surveys which we made indicated that in excess of 50 per cent of our customers have relied upon coal stoves or base burners to heat their homes. The majority of these people lived in bungalows and cottages having five or six rooms.

Our community also has the usual number of small shops, such as the corner drug store, meat market, and grocery.

(Continued on Page 38)

New Trends *in* Compressor Station Design

As Exemplified in the Richland Station at Alto, La.

AT THE beginning of the year 1930, the Monroe natural gas field, in northern Louisiana, had in it five compressing stations serving major pipe lines. These had an aggregate installed capacity approximating 28,000 h.p., but of this barely 8000 h.p. was being operated. This condition was due first, to the customary practice of each pipe line constructing its own compressing station, with capacity for peak load plus spare equipment and, second, to the heavy production from the new Richland field, some 20 miles to the south. The advisability of rapidly draining the Richland field had led several of the pipe lines to take from it the larger part of their requirements.

At that time the pressures existing in the Richland field were so high that compression of the gas was unnecessary; in fact the pressure had to be greatly reduced before it could be taken into the pipe lines. In the early part of 1931, however, the pressure had dropped so low that it was obvious that compression of the gas would be necessary in order to meet the peak load pipe line pressures during the coming winter.

For some years Ford, Bacon & Davis, Inc. had realized the waste, inherent in the multiplication of compressing stations, by reason of excessive total equipment and operating costs. Were a group compressing station to be erected, mutually owned and operated by the several pipe lines in a gas field, it would involve a minimum of equipment, since the peaks of the lines would to some extent offset one another; also the investment for spare equipment, auxiliaries, dwellings and property development would be reduced to that necessary for only one station. The operating expense would similarly be reduced by the need for only one crew. The drop in the pressure of the Richland field afforded an opportunity for the construction of such a group compressing station and plans were made and submitted to the pipe lines and producers. The idea was approved and Richland Compressor Station, Inc. was organized, thus enabling two producers and two pipe lines to avoid erecting their own small compressing stations at high first cost per unit of capacity and with high operating costs.

Features of New Design

The Richland field covers a comparatively small area, which fact, coupled with the rapid drop in pressure, indicated a short remaining productive life. It was therefore essential that the Richland Station should be constructed at the lowest possible cost. Ford, Bacon & Davis, Inc. had developed a design during the previous three or four years, which, while it differed considerably in arrangement from the usual station and thereby effected considerable savings in the cost of auxiliaries and auxiliary piping, employed essentially the same types of equipment and retained all of the operating advantages of the older stations.

Fig. 1 shows an arrangement more or less typical of that followed by many of the pipe lines. The compressor building was parallel to the pipe line and planned to be extended in the direction of flow, the permanent end having an extra bay for truck entrance. Almost invariably, the auxiliary building was of the same width as the compressor building and placed opposite its permanent end. A similar building set beyond the auxiliary building, housed the machine shop, storeroom and lavatory. The suction header left the pipe line at right angles, then turned 90 degrees and ran parallel to the main building, to which the compressor suctions were taken off. The compressor discharges contained expansion joints or U-bends and were assembled in a hot gas header, which also required provision for expansion, and connected with the gas coolers. The coolers were located beyond the hot gas header and their outlets manifolded and brought into the main line. A valve in the pipe line, between this point and the suction take-off, served as the station by-pass. The cooling tower was frequently located beyond the machine shop building. Cooling water lines had to be of ample size for the ultimate station. They ran from the cooling tower basin to the cold water pumps, thence to the cooler inlet header, returning to the permanent end of the compressor building and thence to the engine inlet header. The engine drains returned to a concrete hot-well and hot water pumps, thence to the cooling tower. Cooling water to the extreme unit traversed about 1500 feet of pipe in making the circuit, the greater part of which lay between the cold water pumps and the engines, thus adding to the head on those pumps. The characteristics of cold and hot pumps were therefore quite different and a separate spare pump had to be provided for each service.

The Richland Compressing Station follows closely the type illustrated by Fig. 2, but varies from it in certain omissions mentioned later. This type differs considerably in arrangement from that previously described. The compressor building is set at right angles to the pipe line and extension will be on the further end. The machine shop and power plant are located 50 feet from the engine side of the compressor building, midway of its ultimate length. The pumps and cooling tower are placed on the compressor side of the building, beyond the coolers and pipe yard and opposite the middle of the initial installation. Duplicate pumps and cooling tower are planned to be provided for the future extension. No disadvantage has been found in thus separating the pumps from the auxiliary power plant. The pumps, once started, are practically automatic in operation, as no manipulation of pump valves is necessary with this design.

In details there is also much that has been changed. The truck entrance is eliminated as unnecessary. The building columns are set opposite the aisles between units and, to give operating space around the sides of the end units, a

By

CLINTON B. BROWN, A.S.M.E.

Ford Bacon & Davis, Inc.
New York City

4-foot extension is built at each end. The basement space thus provided is utilized for the lavatory and as locker and storage rooms. By this means the compressor building is reduced to one full bay for each unit plus 8 feet of end extensions, as compared with the former design requiring one full bay per unit plus one and one-half or two bays. The basement aisles between unit foundations are eliminated and the continuous mat raised well above the basement floor and combined with the lower portions of the engine blocks, thus effecting considerable savings in excavation and concrete. The machine shop and power plant building is much reduced by the removal of the pumps, lavatory, etc. and its cost is further lessened by its narrow shape.

Trickle chargers are used in place of the usual motor-generators, their small space requirement making it possible to install the entire ignition system in a vapor-proof cabinet located in the basement of the compressor building.

Water System

The water system is materially changed and full patent rights are reserved by Ford, Bacon & Davis, Inc. with respect to the new design. The pump house now consists of a pit only deep enough to permit the pumps to be primed by gravity from the cooling tower basin and only large enough to provide for three pumps and two air compressors. This pit is covered by a light steel structure, high enough on the front for a door and window sash. The roof slopes to the rear, which, with the ends, is solidly sheathed as a protection against drift from the cooling tower. The water pumps are all identical and are reduced in capacity by the division of the water system. They are so piped that only one spare pump is needed and can be used for either hot or cold water service. The large concrete hot-well is omitted and a vertical piece of 36-inch pipe used instead. The cooling tower basin has a screened intake chamber near either end, from which 12 inch lines lead to both ends of a pump suction header serving all three pumps. The line nearest the hot water pump connects first into the hot-well. A 10-inch discharge header also serves all three pumps, but is valved either side of the spare pump connection, to permit its being placed on either hot or cold service. The elevations of the cooling tower and elevated water tank are such

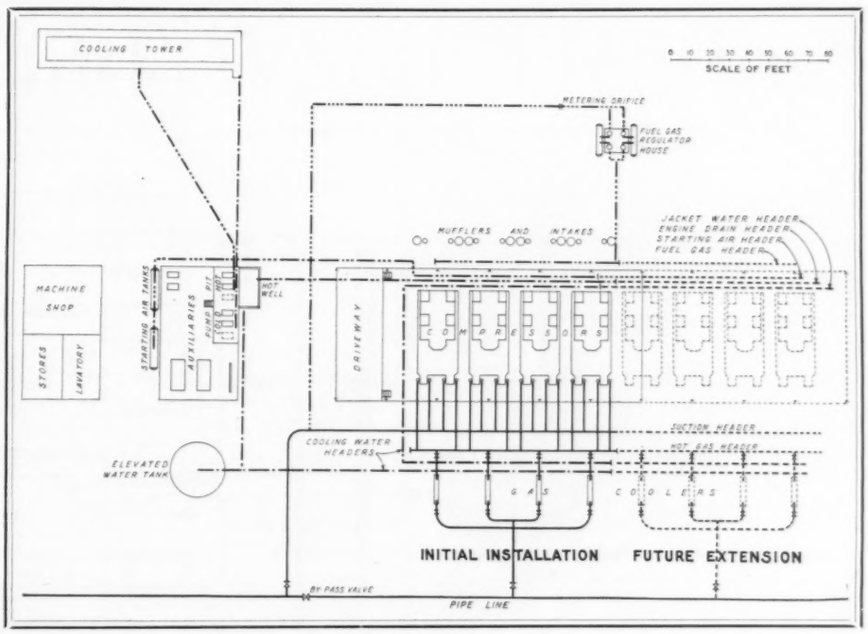

FIG. 1.

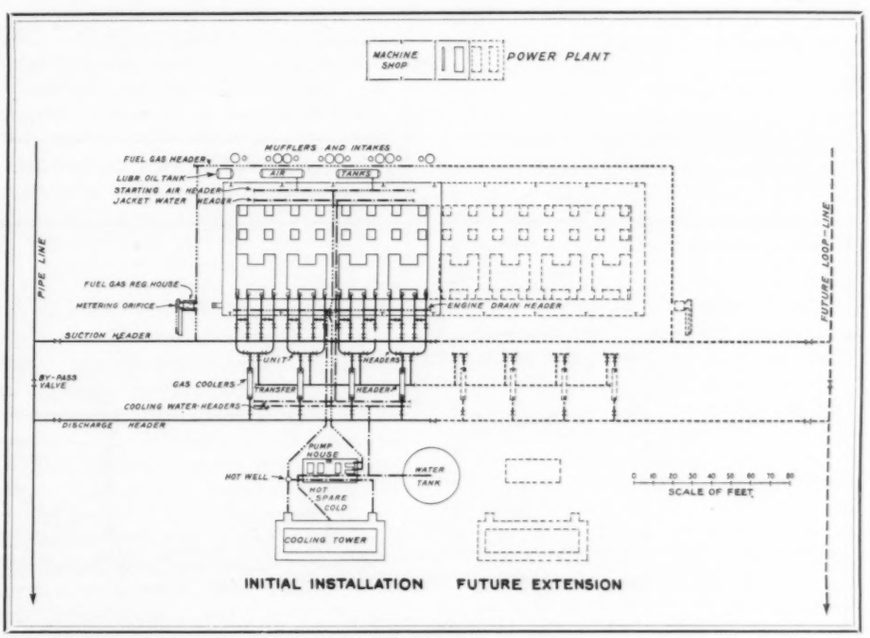

FIG. 2.

that there is slightly more head on the cold water pump than on the hot pump, thus insuring that the latter will operate at a lower point of the characteristic and draw some cold water in addition to taking all of the drains coming into the hot-well. The hot water pump end of the pump discharge header leads to the cooling tower top, and has a by-pass, for winter use, to an intermediate distribution deck. The cold pump end of the header leads to the gas cooler inlets, with a connection to the elevated water tank which maintains it full and insures that it will feed the system should the pump shut down. The gas coolers are piped in parallel between the water inlet and outlet headers. At the middle of the outlet header a 10-inch line runs straight through between units No.'s 2 and 3 and connects into the engine inlet header which runs along the face of the compressor foundation mat. The engine drains come off, at the compressor ends of the units, into a drain header, from the middle of which a 12-inch line runs to the hot-well. It will be seen that in this arrangement of the piping the main

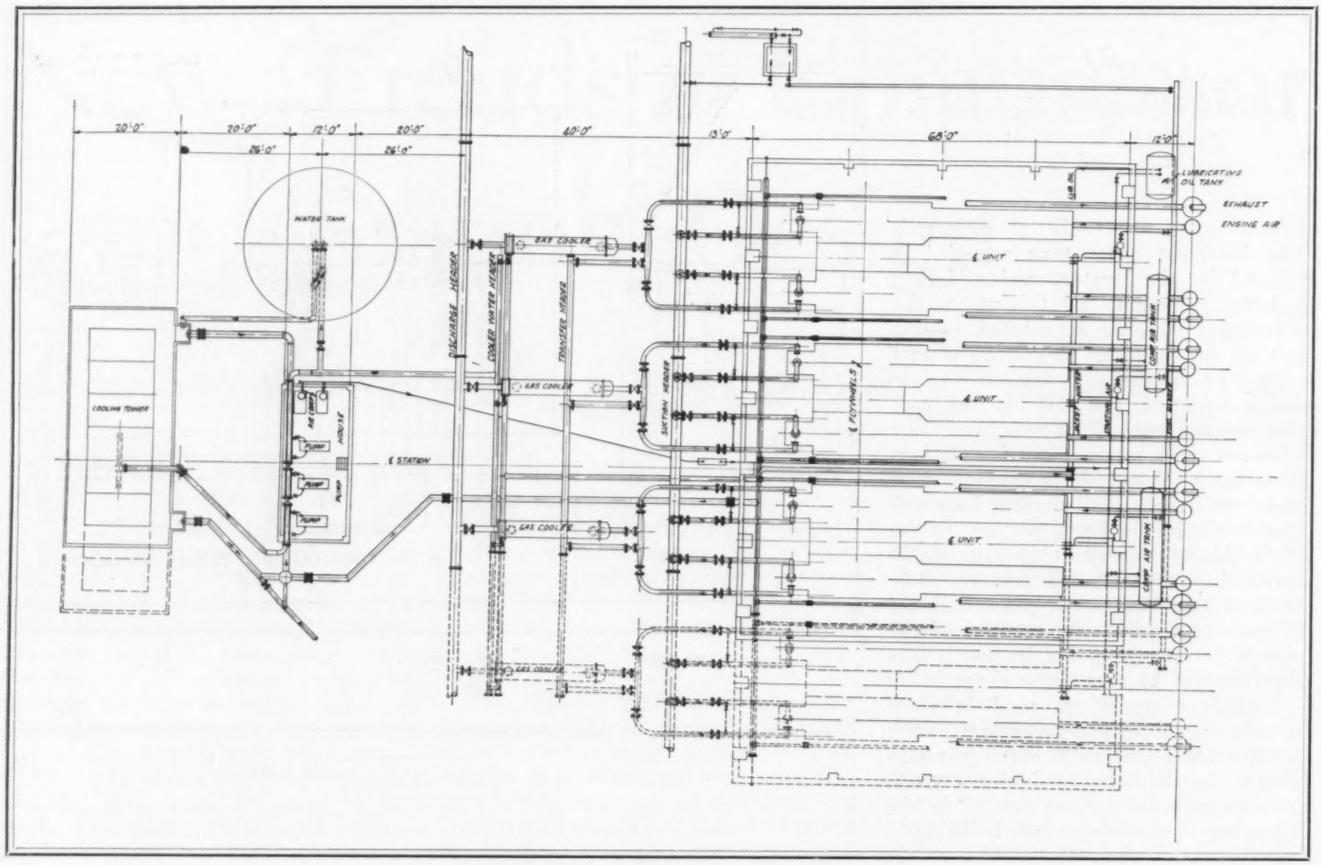

FIG. 3. PLAN OF RICHLAND STATION.

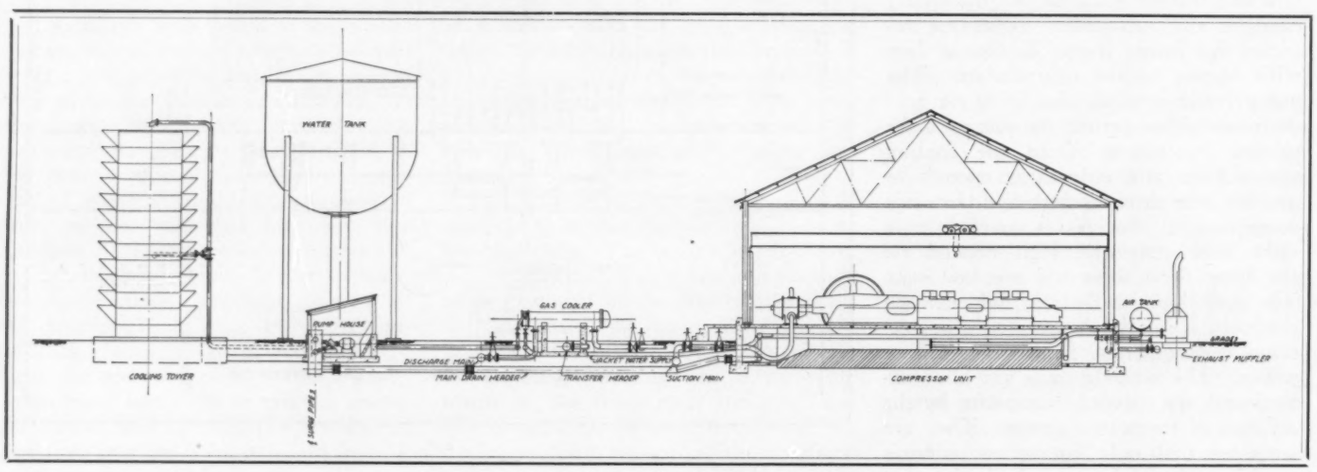

FIG. 4. CROSS-SECTION, RICHLAND STATION.

lines run midway between and branch either way to the units which they serve, thus equalizing the pressures at the units and shortening the distance which the water must travel to about 600 feet. The friction losses in the water piping are thus materially reduced. Coupled with the reduction in capacity obtained by halving the water system, making it proportional to the initial installation only, this reduction in friction loss results in smaller pumps and less power to drive them and permits the use of much smaller sizes of pipe. All water piping is of welded construction.

Gas Piping

The gas piping is modified to reduce to a minimum the lengths of pipe carrying hot gas and to provide such pipe with adequate facilities for expansion. The suction and discharge headers take off straight from the pipe line, and can be continued past the future extension, which they would serve, to connect into a possible future loop-line beyond. This arrangement of headers permits operation of the ultimate station on either the initial or the loop-line, or partly on one and partly on the other, or equalized between the lines as may be desired. Suction connections to the compressors are taken off the header close to the center lines of the units and,

(Continued on Page 45)

Low Demand Water Heating

By RAY G. PENNING
Plant Superintendent
Spokane Gas & Fuel Company

AN analysis of electric competition in Spokane disclosed that the severe inroads made by electric service in domestic cooking and water heating were due to the extremely low operating cost of the low demand electric flat rate water heaters.

There are not many services in the home more appreciated than hot water, always on tap. The principal reason this service is not available in the majority of homes is due to the cost of supplying it.

For many years, the power company in Spokane has sold water heating through a 600-watt electric heater at a flat rate of $2 per month, a 750-watt heater at $2.50 per month, and a 1,000-watt heater at $3 per month.

Without going further into detail as to the popularity and demand for this service, it may be noted that there are about 6,500 electric ranges in use in Spokane and there are also that many electric flat rate water heaters. It was also found that the greatest reason for a customer to change from gas cooking and water heating service to electric was this hot water service which could be had at a low predetermined cost.

With this information at hand, we decided to do some experimenting with low demand gas water heaters. Considerable development work on the part of our superintendent, W. C. Coakley, brought about the invention of the Coakley heater, which we had patented. This heater is now being manufactured under the name of the Thrift heater by the Surface Combustion Co.

With this heater, we can go our electric competitors one better. For $2 a month, flat rate, we sell this hot water service with the burner adjusted to a maximum output of 2940 B.t.u. per hour. This will deliver 1160 gallons of 180° F. water per month, while the $2 flat rate electric heater will deliver only 864 gallons of water of the same temperature.

A further advantage of our heater is the flexibility in taking care of increased hot water requirements. On application of the customer, we can easily increase the burner consumption.

We are selling hot water service with this heater in Spokane on a flat rate basis to meet a local competitive situation. In other cities, gas companies are finding a ready market for this constant demand heater, selling the gas on a metered basis.

THE following paper, prepared by Mr. Penning, was read at the February 18 luncheon program of the Pacific Coast Gas Association Mid-Winter Conference at Los Angeles, by Jas. L. Stone, president of the P.C.G.A. and vice-president and general manager of the Spokane Gas & Fuel Company. Its subject is one of particular importance to manufactured gas properties, butane-propane town plant systems, and other gas systems where circumstances demand a high rate level or where electrical competition is keen. In Spokane the low-demand gas water heater has been developed to offset the inroads of low-demand electric heaters. Its sale does not interfere with the development of the instantaneous and quick-recovery water heating load, for it taps a market which otherwise would be denied the advantages of automatic gas-fired hot water. Selling these heaters for use on a flat rate, and other aspects of their use, are described by Mr. Penning.—*Editor.*

An analysis of customer complaints on high bills reveals the fact that, paramount among the causes, is waste of hot water. The principle of the constant demand automatic water heater and the service it renders its owner is based, not on what might be called the conservation of hot water supply, but rather on the intelligent use of hot water, guarding against waste, leaking faucets, servants' carelessness and other factors which cause an extravagant use of gas.

High bill complaints create dissatisfied customers, directly affecting the cordial public relations of the public utility. The customer, after receiving several bills which he considers unreasonable and not in line with the value of the service rendered, is apt to ask the removal of the hot water heating equipment and to turn to another method of securing this service. He either uses his old equipment on a greatly decreased scale or invests in new equipment, consuming fuel competitive to gas. Gas, in this case, will suffer, not only with the user discontinuing his service, but also because it has to face the reflection created by this customer telling his friends and associates of its high cost and undesirable features from a water heating standpoint. These customers begin to question their bills, and the process may continue, until the company's revenues are seriously affected.

The constant demand water heater, when sold on its rightful basis, eliminates this condition, as customers are told to use their hot water intelligently so that at all times they will have an ample supply. The greatest appeal, perhaps, is in its ability to furnish an adequate supply of automatic hot water at a predetermined cost. Thrifty people appreciate this feature. What it will cost to operate, is the foremost question governing customer purchases. First investment cost is, of course, a fundamental factor, but the service the appliance will render, its life, operating cost, what it will do to bring greater health, comfort, convenience and happiness to the home, are of greater consequence and are factors each prospective customer reasons out before arriving at a point of desire, where the worth of the appliance outweighs its cost, and the sale is consummated. Convenient time payments greatly offset the objection of the first cost.

When people are cautioned as to the waste in the use of their hot water supply, they will watch for and soon find the reason, should they use more than the capacity of the constant demand heater. The gas company may have complaints along this line, but the situation can be met and the customer will continue to use gas for water heating, for through his intelligent use of hot water, he directly helps his finances by reducing the cost of hot water. It has been said that one of the quickest ways to affect the reasoning power of people is through their pocketbook, and surely the gas company which makes recommendations on economies in operation that will save the customer's outgoing dollars, not only builds a better customer understanding and good will, but places itself in a position to sell the customer additional services, which, in the overall add greater per customer cubic foot sales and revenues.

The constant demand heater is not offered to meet the hot water requirements of families which develop large needs through shower baths and other great quick-demand uses. But this class

(Continued on Page 36)

A Promotional Room Rate *for*

By F. H. COUGHLIN

Assistant General Manager
Empire Southern Gas Company
Empire Southern Service Company

TABLE NO. 1.

No. of Rooms	Average M.C.F. Per Customer	Average Rev. Per Customer	Approximate Revenue Tentative Rate
3 rooms	50.88	46.20	56.42
4 rooms	53.76	48.00	56.90
5 rooms	65.16	55.92	58.88
6 rooms	79.56	66.48	61.29
7 rooms	76.80	64.20	60.88
8 rooms	103.44	84.48	65.17
9 rooms	180.48	141.48	77.96
10 rooms	120.60	97.80	67.98
Average of all	70.80	60.24	

TABLE NO. 2.

No. of Rooms	Average Annual Use Per Room	% Total Rooms	
3 rooms	17.0	4.56	
4 rooms	13.4	11.31	11.31
5 rooms	13.1	36.68	36.68
6 rooms	13.2	24.91	24.91
7 rooms	11.0	8.84	
8 rooms	12.9	6.42	6.42
9 rooms	20.0	1.72	
10 rooms	12.1	5.56	
	13.2	100 %	79.32

IN VIEW of the interest shown in the promotional room rate recently established on one of our small properties, it is probably in order to set forth the rates and reasoning which led to the adoption of this rate as an experiment.

The wide spread rate-reduction agitation during the past two years is, no doubt, a function of the depression, but probably would have been experienced to some extent due to concerted public action aroused by the exceptionally high bills of January 1930 and of January 1931. Certainly, the present agitation is exceptional only in degree—every local manager will bear witness to the complaints usually experienced during the winter months of every year. It is worthy of note that the annual plaint is not confined to chronic kickers and that dissatisfaction is expressed by the public in general.

The complaint expressed is against "high bills", but there is evidence that the actual dissatisfaction is against "relatively" high bills. The complaints are no fewer nor less in degree in places with low rates per thousand than in places which have high rates per thousand. During the last winter season organized public complaint was reported in the press in cities having domestic rates of 28c per M, 37c per M, 50c per M and 75c per M respectively. In all of these instances the gas utility suffered as a result of this organized protest. Fearing high bills, the customer is overly thrifty in the use of gas and, in spite of his physical discomfort, he finds at the first of the month that his bill is nevertheless relatively high.

We cannot be surprised at the customers complaint if we analyze the operation of our rates. We find that we collect approximately 55 per cent of our annual revenue in the four winter months and quite often as much as 17 to 20 per cent of the annual revenue in one month. Conversely in the four summer months we collect from the customer only 14 per cent of our annual domestic revenue, although during these months the returns are fairly well balanced and represent about 3½ per cent per month. Since these facts obtain, there is little wonder that the customer complains of (relatively) "high bills."

The preservation of public relations and earnings demands a change in the rate forms on the part of the gas utility. Ill-feeling on the part of the consumers is prompting municipal ownership or competitive plants since the usual remedy —horizontal rate reductions—still leaves the greatest complaint, i.e., relatively high bills. Furthermore, ordinary horizontal rate reductions do not seem to suffice since they always confirm the public's opinion that the former rates were unjustly high, and, further, there is always the question in the public's mind that a greater reduction might have been obtained had they been represented by better traders. Horizontal rate reductions do not materially increase the consumers use of gas; consequently, this form of reduction is more or less permanently reflected in the net income of the utility company.

The present rate forms are not sound since they actually penalize the customer for using more than a normal amount of gas. The "rate per thousand" form, based only on quantity used, includes charges for capital, operation, and maintenance; consequently, the customer who uses more than a normal amount and who has already paid his prorata share of fixed charges must pay an additional fixed charge per thousand for all gas used in excess of normal. This does not encourage the use of gas. If a rate could be devised which would promote the additional use of gas per customer, it is conceivable that the utility might offer voluntary rate reductions based on this form of rate, thereby gaining in public esteem, and also the utility thereby might hope to retain its earnings. Analysis of revenues and customers' use leads us to the belief that

TABLE NO. 3. M.C.F. PER ROOM PER YEAR

	Town A Arkansas	Town B Texas
4 rooms or less	15.4	14.3
5 rooms	13.3	13.9
6 rooms	13.6	14.2
7 rooms	13.9	13.6
8 rooms or more	15.4	15.5
Average	14.2	14.2

Domestic Customers

HIGH bill complaints, which every gas company has learned to expect with cold weather, are actually complaints against 'relatively' high bills, says the author of this article. Mr. Coughlin here presents a new type of rate which is being applied on one of his company's Texas properties. By spreading gas service charges more uniformly throughout the year this rate aims to treat the high bill complaint at its source.
—Editor.

it is possible to devise such a rate form.

For the purpose of demonstrating this, analysis is here confined to results obtained in a small town on an isolated gas system in central Texas. The system required to serve this town (population approximately 4000) represents a relatively large capital investment. The analysis covers the second year of gas service—May 1930 to April 1931, inclusive. The data on which the analysis and rate form were originally based were not quite complete. It was, therefore, subsequently revised and completely reviewed by B. P. Stockwell. From these data there are abstracted such as seem pertinent to the purpose of this article. It should be noted that the analyses were confined strictly to residential customers.

The rate under which this town has been served was conventional in form; namely, a $2 minimum which allowed the use of 2 M.c.f. per month and 75c per M for all in excess. The penalty for payment after the 10th of the month was 10 per cent. This rate developed a weighted average use of 70.80 M.c.f. per customer per year and a revenue of 60.24.

This average suggested a tentative rate form which is promotional and which might eliminate the objections of the customer as outlined above. A flat rate of $4 per month per customer plus a charge of 16.6c per M for gas used would produce a revenue of $60 per year and would tend to equalize the monthly bills: for the average customer the maximum winter month bill would be approximately $6.10 and the minimum summer month bill would be approximately $4.35. In addition to equalizing the monthly bills it would permit the customer to use additional gas at a very low rate and to that extent the tentative rate is promotional. In fact, this seemed almost so certainly true that it offered the possibility of reducing the existing rate and yet maintaining revenue for the company. This cannot be said for any horizontal form of rate reduction.

Inertia would raise many objections to such a rate form, but the legitimate objections which came to mind first were that the rate would increase the peak load; that the $4 feature presented a wide open mark for the demagogues to shoot at (ignoring, as always, that it might properly represent a fair investment charge); and that the rate would be too hard to "sell" to the public. However, the most serious objection is that the rate can be demonstrated to be unfair. These objections will be discussed hereafter, although not in order. The last objection will be treated first.

From an analysis of the customers' use and revenue in the town noted above we found that the annual use and revenue for houses of various sizes was as shown in table No. 1. (First three columns only.)

The fourth column shows the effect of applying the tentative rate to houses of various sizes. For houses of five rooms and under this rate would constitute an increase, while for the larger houses the effect would be a decreased rate. An unfair portion of the expense of operation would be carried by small and large houses—in a converse sense. Such a rate would be untenable, but inspection of Table No. 1 suggested a modification of the tentative rate which might remove the objection of unfairness.

If the total M.c.f. annual use for each size house is divided by the number of rooms, it will be noted that there is a remarkable uniformity in the use per room. The uniformity is more significant by adding thereto (Table No. 2) a column showing the per cent of the total rooms represented by each class of house. Almost 80 per cent have the same use per room. Further analysis shows that the divergency from "normal" expressed by the 7, 9 and 10-room houses is not significant since in this instance there are only a few consumers in each class and thrift or abnormal use of a few in the classifications would distort the average. While the same statement might be true of the three-room houses, like analyses in other towns have shown that a higher-than-

(Continued on Page 56)

TABLE NO. 4. SUMMARY OF RESIDENTIAL EXPERIENCE—ALL MONTHS COMBINED

No. of Rooms	No. of Cons. Months	Total Rooms	Total M.C.F.	Gross Rev.	M.C.F. per Room per Mo.	Weighted Avg. Gross Rev. per Cons. per Mo.
3 rooms or less	445	1,335	1,888	1,712.75	1.41	3.85
4 rooms	828	3,312	3,724	3,311.25	1.12	4.00
4 rooms or less	1,273	4,647	5,612	5,024.00	1.21	3.95
5 rooms	2,149	10,745	11,674	10,021.25	1.09	4.66
6 rooms	1,216	7,296	8,057	6,740.75	1.10	5.54
7 rooms	370	2,590	2,368	1,981.25	.91	5.35
8 rooms	235	1,880	2,025	1,653.50	1.08	7.04
8 rooms or over	454	4,014	4,505	3,641.75	1.12	8.02
9 rooms	56	504	842	660.25	1.67	11.79
10 rooms or over	163	1,630	1,638	1,328.00	1.00	8.15
Total	5,462	29,292	32,216	27,409.00	1.10	5.02

The Flow *of* Gas *in* Distributor-Feeder Mains

By NORMAN L. HOFF

Assistant Engineer
*Los Angeles Gas and Electric Corporation**

PERHAPS the largest single factor affecting the efficient utilization of distribution capital is the flow of gas. Without an intimate knowledge of the laws governing gas flow, an equitable balance between adequate service and capital investment is impossible.

The flow of gas in feeder mains has long been known. The flow of gas in distributor mains is just now becoming generally understood. The flow of gas in distributor-feeder mains, with which this paper deals, was entirely unknown until a few years ago. Until this type of flow is universally understood and applied, the ultimate of economy in distribution design can never be reached.

Distributor-Feeders

The definition of a distributor-feeder is, "A gas main which serves the double purpose of delivering the gas from a source of supply to the services connected to it, and also, of delivering gas to other types of mains." The special case of a perfect distributor-feeder imposes the additional conditions, that services be equally spaced and have equal demands.

It is evident from these definitions that the distributor-feeder, as its name implies, functions partly as a feeder and partly as a distributor. In discussing the flow of gas in this type of main, it would, perhaps, be well to review the two fundamental types of gas flow which, when combined, govern the flow in distributor-feeders.

Flow of Gas in Feeders

Practically all of the better known gas flow equations, such as, Spitzglass, Weymouth, Unwin, Pole, Cox, Pittsburgh, etc., are derived on the basis of the feeder flow. Consequently, what is said in regard to the Spitzglass formula, which will be used hereafter, applies equally well to any of the others.

The Spitzglass low pressure formula may be written as follows:

$$Q = 3550\,K\left(\frac{h}{SL}\right)^{\frac{1}{2}} \text{ ------(1)}$$

in which,

Q=Quantity of gas discharged at 60 deg. F. and 30 inches Mercury pressure.

N. L. Hoff

$$K = \left(\frac{D^5}{1 + \frac{3.6}{D} + .03D}\right)^{\frac{1}{2}}$$

D=The pipe diameter in inches.

h=Pressure loss in inches of water column pressure.

S=The specific gravity of the gas referred to air.

L=Length of pipe in feet.

A formula of this type may only be applied when *all* of the gas entering one end of the pipe is discharged at the other end.

Flow of Gas in Distributors

In calculating the flow of gas in distributors the flow under feeder conditions is first obtained, and then modified to apply to distributor conditions. In the case of perfect distributors where the bleed-off spacings and demands are equal this modification is accomplished by multiplying the value of (Q), obtained in (1), by the factor (R) where,

$$R = \left(\frac{6n^2}{(n+1)(2n+1)}\right)^{\frac{1}{2}} \text{ ------(2)}$$

in which,

n=The number of bleed-offs or unloading stations along the pipe.

The factor (R) may only be applied when *none* of the gas entering one end of the pipe is discharged at the other end.

Flow of Gas in Perfect Distributor-Feeders

In calculating the flow of gas in distributor-feeders, an entirely new expression for (Q) in (1) is computed. This expression, which is called (Q_e), is the amount of gas which would flow under feeder condition with the same loss in pressure. Therefore, the formula for distributor-feeders is (1) with Q_e substituted for (Q) thus,

$$Q_e = 3550\,K\left(\frac{h}{SL}\right)^{\frac{1}{2}} \text{ -------(3)}$$

where

$$Q_e = \left[\frac{Q^2+Q_1^2}{R^2} - \frac{Q_1^2}{n} + \frac{QQ_1}{3}\left(1 - \frac{1}{n^2}\right)\right]^{\frac{1}{2}} \text{-----(4)}$$

in which,

Q=Total quantity of gas entering one end of the distributor-feeder.

Q_1=The quantity of gas discharged at the other end of the distributor-feeder.

n=The number of bleed-offs on the distributor-feeder.

As will be better understood presently, equation (4) has several advantages over equation (13) as it appears in the 1931 report of the Pacific Coast Gas Association Distribution Design Committee. As a matter of fact, however, equation (4) is merely a mathematical transposition of old equation (13). Notwithstanding this simplification, equation (4) is still rather complex. This is especially true in network flow calculations, where trial and error methods must be employed. It is suggested, therefore, that when refined computations are not necessary, or when making trials for network flow, the following approximate form of (4) be used:

$$Q_e = \left(\frac{Q^2+Q_1^2}{R^2} + \frac{QQ_1}{3}\right)^{\frac{1}{2}} \text{ ------ (5)}$$

It may readily be seen that the error resulting from it is equal to,

$$\frac{Q_1^2}{n} + \frac{QQ_1}{3n^2}$$

but from the way this quantity enters the equation, it is negative, hence, its omission will result in a higher figure for Q_e which is an error on the side of safety—in most cases less than 10 per cent.

Flow of Gas in Imperfect Distributor-Feeders

In actual practice, a perfect distributor-feeder is seldom encountered, the common type being the imperfect kind. In fact, in some cases, as in designing new sub-divisions or tracts, the number, spacing and demand of the bleed-offs are all unknown. In these cases it is wise to base the entire problem upon the

* Presented at the Pacific Coast Gas Association Mid-Winter Conference, Los Angeles, Calif., February 17-18, 1932. The author is chairman of the P. C. G. A. committee on Distribution Design.

length of the main. A normal assumption would be, a demand of 1 foot of gas for each foot of main, and a bleed-off each 50 feet. Equation (2) then becomes,

$$R = \left(\frac{GL^2}{(L+50)(2L+50)}\right)^{\frac{1}{2}} \text{-------(6)}$$

The distributor-feeder formulae are derived for application when a part of the gas entering one end is discharged at the other.

Hypothetical Problem

From Fig. 1, is the greatest pressure loss, between the feeder main on Los Angeles Avenue, and the last consumer to be supplied, consistent with good service?

FACTS

1. The main on Oro Street, between Los Angeles Avenue and Yates Avenue is a 4-inch low pressure distributor-feeder, 805 feet in length (Fig. 1).
2. The main on Yates Avenue running north from the end of the distributor-feeder on Oro Street, is a 1½-inch, low pressure distributor, 307 feet in length.
3. The main on Yates Avenue running south from the end of the distributor-feeder on Oro Street, is a 2-inch, low pressure distributor, 370 feet in length.
4. A "Gas Demand Survey" on the above three items disclosed the following:
   (a) On Oro Street, there are 23 dwellings, containing 95 appliances with a total rated capacity of 2,789 cu. ft. per hr.
   (b) On Yates Avenue, north, there are four dwellings containing 15 appliances with a total rated capacity of 507 cu. ft. per hr.
   (c) On Yates Avenue, south, there are 12 dwellings containing 53 appliances with a total rated capacity of 1,780 cu. ft. per hr.
5. The gas supplied, will be of 0.7 specific gravity, and 1,100 B.t.u. quality.

ASSUMPTIONS

1. The demand of the consumers' appliances will conform to the theory of diversity.
2. The vacant property along the three mains, when dwellings are built, will have similar types and kinds of appliances as the existing dwellings. The adjusted "Gas Demand Survey" figures are then,
   (a) On Oro Street, rated connected load=3,516 cu. ft. per hr. on 120 appliances.
   (b) On Yates Avenue, north, rated connected load = 634 cu. ft. per hr. on 19 appliances.
   (c) On Yates Avenue, south, rated connected load = 1,780 cu. ft. per hr. on 53 appliances.
3. The feeder main on Los Angeles Avenue will furnish an ample supply of low pressure gas.
4. A pressure loss standard of 1 inch water column, between the feeder main and the last consumer supplied, will comply with the rules of good service.
5. The barometric pressure will average 14.73 lbs. per sq. in.
6. The limit of justifiable risk in computing design loads will not be less than J = 1,000.

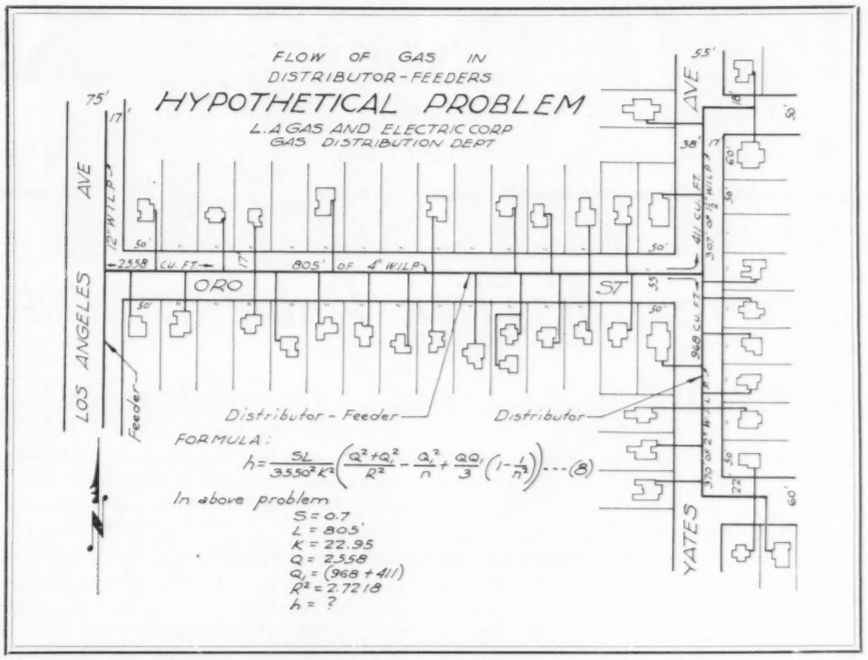

Fig. 1.

DISCUSSION

Assumption No. 1: Such an assumption is, naturally, only justified when it is known that the consumers being supplied are strictly domestic. If a fairly large portion of the consumers were industrial, with more or less constant loads, the theory of diversity would not hold, and this assumption could not be justified.

Assumption No. 2: In this particular problem no provision was made for probable future extension of the distributor mains on Yates Avenue. As a rule, however, such an adjustment must be made in addition to providing hypothetical loads for the vacant property.

Assumption No. 3: In actual practice this assumption should never be made, part of the solution of the distributor-feeder being to trace the pressure drop back to the source. In this problem it is assumed such a check has been made.

Assumption No. 4: This is largely a matter of individual opinion; however, it is questionable whether a larger pressure loss standard should be permitted.

Assumption No. 5: Refers to the yearly average barometric pressure.

Assumption No. 6: By assuming J = 1,000, a reasonable safty factor is introduced.

CALCULATIONS

Considering first the distributor main on Yates Avenue from Oro Street north, there is a rated connected load of 634 cu. ft. per hr. (Assumption No. 2—'b') and 19 appliances, therefore,

$$D_L = \frac{Q_R}{\text{LOG}\left(\frac{48}{\text{LOG } J} + A\right)} \text{----(7)}^*$$

*Proceedings of the Pacific Coast Gas Association, Volume 22, Page 485.

and substituting

$$D_L = \frac{634}{\text{LOG}\left(\frac{48}{\text{LOG } 1000} + 19\right)}$$

$$D_L = 411 \text{ Cu Ft Per Hr}$$

Similarly for Yates Avenue, south, the design load equals 968 cu. ft. per hr.

Now, since the amount of diversity is dependent upon all appliances downstream, the design load for the distributor-feeder must be based on the sum of all the rated connected loads and appliances, not the sum of the individual design loads. Therefore,

$$D_L = \frac{5930}{\left(\frac{48}{\text{LOG } 1000} + 192\right)}$$

$$D_L = 2558$$

Returning to Yates Avenue from Oro Street, north, it will be noted that there are three bleed-offs, so applying equa-

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Pacific Coast Gas Association

Managing Director: Clifford Johnstone

Association Headquarters: 447 Sutter St., San Francisco

President: Jas. L. Stone

Vice-President and Gen. Manager, Spokane Gas and Fuel Co.

Program of High Value at Mid-Winter Conference

INTO the two-day Mid-Winter Conference at Los Angeles, February 17 and 18, the Association condensed a program which would do credit to a full fledged convention, and the excellent attendance at both general session and sectional meetings attested the interest taken by the membership in this annual feature on the Association calendar. The banquet held Wednesday evening, and the luncheon Thursday filled the Los Angeles Gas and Electric Corp. auditorium to capacity on both occasions. All sessions were at the L. A. Gas and Electric Corp. building.

President Jas. L. Stone, presiding at the opening general session on Wednesday morning, called attention to the new group organized as the Manufacturers' Section of the Pacific Coast Gas Association, and introduced R. L. Hinckley, chairman. Mr. Hinckley dealt briefly with the objectives of the new section in effecting a close cooperation between utilities, manufacturers and manufacturers' dealers. The section will function in making effective the standards of practice developed by the A.G.A. Manufacturers' Section, of which the P.C.G.A. Manufacturers' Section will constitute the Pacific Coast Division.

"Cooperative Selling Campaigns" was the theme of two contributions at the opening general session, F. M. Banks dealing with Southern California cooperative plans, and Bert W. Reynolds presenting the experience of the Pacific Gas and Electric Co. in developing northern California markets through company-dealer efforts. Mr. Banks discussed the program which is in process of development in southern California, to bring the united strength of utilities, manufacturers and dealers into play on definite campaigns. Ranges have been selected for first campaigning, and other appliance campaigns are also being formulated. Mr. Banks also introduced evidence of unsaturated appliance markets which can be sold best through united effort.

Mr. Reynolds covered in detail the cooperative program which his company has been furthering for several years. Some of the highlights in the P. G. and E. program mentioned are the employment of dealer cooperative representatives in each division, calling attention to dealer outlets in all company advertising, setting of dealer quotas to stimulate dealer contacts in each company division, dramatization of the company's 1932 sales program by means of a road show, use of extended terms through uniform finance charges in cooperative campaigns, preparation of a standard code for installation of warm air heating in northern California.

A series of short discussions under the head of "What Activities Does the Gas Industry Need to Stress Most Now?" brought the first session of the conference to a close. To this symposium W. M. Henderson contributed a message on safety in gas service; L. M. Edwards spoke on the need for selling the economy of natural gas fuel; Oscar Moore told of what utilities can do toward "Meeting the Consumer Half Way"; F. J. Schafer in a paper read by R. M. Bauer recommended ways for increasing public confidence in gas service.

The dinner meeting Wednesday offered a much enjoyed program. An orchestra and a vocal quartet were provided by representatives of the L. A. G. and E., and Southern California Gas Co., respectively. D. L. Scott, in his illustrated talk "Beginning at Jerusalem," sold the thought that gas companies should begin their work of educa-

STATISTICS OF GAS UTILITY OPERATIONS FOR 1931 AS COMPARED WITH 1930

For the States of California, Arizona, Nevada, Oregon and Washington and the Province of British Columbia

FIGURES compiled from individual companies through Association headquarters have been tabulated, and the following comparison of gas utility operations in 1931 with 1930 is available. These figures are totals for the Association area, and the details of the annual report by states may be had from Association headquarters.

	1930	*1931*
Production—M.c.f.		
Water Gas	3,157,218	3,044,755
Coal Gas	1,637,334	1,508,872
Oil Gas	16,252,640	8,173,946
Coke Oven Gas	656,926	640,584
Butane Gas (550 B.t.u.)	.....	157,274
Natural Gas Purchased	126,566,082	163,191,133
Total	148,270,200	176,716,564
Active Meters Dec. 31		
Domestic	1,560,057	1,617,388
Industrial	66,617*	26,382*
Total	1,626,674	1,643,770
Sales—M.c.f.		
Domestic	59,869,872	64,502,097
Industrial	72,218,712	84,359,467
Total	132,088,584	148,861,564
Revenue (Gross)		
Domestic	58,144,414	59,881,937
Industrial	17,270,757	16,810,266
Total	75,415,171	76,692,203
Miles of Main in Service Dec. 31	23,984	25,431
Number of Employees Dec. 31	11,587	11,614

tion with their own employees, particularly as regards the fundamentals of gas utilization. A stimulating address on "Advertising's Task in Return to Normalcy," was given by Dr. Winfield Barkley, of the Bank of America, Los Angeles. Representatives of the L. A. Gas and Electric new business department brought the evening to a close with a skit by the title of "A Fiance for Fanny." In a number of highly humorous situations the moral was impressed that misunderstandings are at the root of most arguments.

H. L. Masser, vice-president of the Association, presided over the luncheon program Thursday, and introduced President Jas. L. Stone, who delivered a paper on "The Low Demand Storage Water Heater." This paper, prepared by Ray G. Penning of the Spokane Gas & Fuel Co., of which Mr. Stone is vice-president and general manager, is published in this issue of *Western Gas*.

Following adjournment of the luncheon, the final session of the conference assembled to hear three outstanding features. Henry C. Newton, prominent Los Angeles architect, in his address "As Ithers See Us," gave a challenging message. The public, said Mr. Newton, has a right to assume that the gas company will deliver 100 per cent value and efficiency in its commodity and service, but cordial relations must go hand in hand with these essentials. Gas company practices which hamper such relations were frankly discussed. Intelligent and ample use of advertising was urged to put the utility story before its patrons, to check the inroads of competing fuels and competing economic doctrines such as municipal ownership, and assist the industry to rise to its full opportunities in expansion of service. Next came an address on "The Inter-Relations of Credit and Business in Dedeveloping Our Modern Commerce," in which Dr. J. Harry Tregoe, director of the Credit Economic Council, Los Angeles, discussed present economic conditions in the light of the historical background of modern credit structure. Concluding the session, Roy M. Bauer spoke on "When It Snows in Southern California," dealing with operating problems and gas dispatching during periods of peak loads and fluctuating demand in the southern California area.

A number of the papers presented in the several section programs which were held during the conference appear in this issue of *Western Gas*. The Commercial, Publicity and Advertising, and Technical Sections conducted two meetings each, and the Accounting Section one meeting, at which committee projects were furthered and numerous papers of merit were presented.

L. M. Klauber

M. B. Fowler

A. E. Holloway

J. A. Cannon

Promotions for San Diego Executives

WM. F. RABER, president of the San Diego Consolidated Gas & Electric Co., San Diego, Calif., announces the election of L. M. Klauber, former general superintendent, to the position of vice-president in charge of operation. The promotion is in appreciation of 21 years of service with the company.

Five other promotions were also announced by President Raber.

M. B. Fowler, who for the past 27 years has occupied the position of secretary-treasurer, was elected to the office of vice-president and treasurer. He has been associated with the gas and electric company for 28 years.

A. E. Holloway is now vice-president in charge of sales. Formerly, he was superintendent of the commercial department and has been with San Diego Consolidated since 1910.

J. A. Cannon, who has seen 23 years of service with the company, was elected to the office of secretary and general auditor.

H. R. Peckham, assistant general superintendent for the past 10 years, was appointed general superintendent.

E. D. Sherwin is now assistant general superintendent, a promotion from his former position as assistant to the general superintendent.

Mr. Klauber was born in San Diego, Calif. in 1883. He was graduated from Stanford University in 1908 with an A.B. in electrical engineering, and following the Westinghouse graduate apprentice course from 1908 to 1910 he joined San Diego Consolidated in February, 1911, as salesman in the commercial department. Since that time he has occupied various posts with the company, as engineer in charge of the record department, superintendent of the electric department, assistant general superintendent, general suprintendent until in 1923 when he was made vice-president and general superintendent. He served as 1927-1928 president of the Pacific Coast Gas Association.

Mr. Fowler was born in Santa Clara, Calif., in 1879, becoming affiliated with San Diego Consolidated Gas and Electric Co., in 1899 as clerk. In 1905 he was advanced to the position of secretary of the company, and in 1907 was elected to the board of directors and to the post of treasurer. In 1921 he became a member of the executive committee and 11 years later was advanced to the position of vice-president and treasurer.

Mr. Holloway came to California as a graduate in electrical engineering from Purdue University and following a course in the Westinghouse graduate apprentice school. In February, 1910, he joined the staff of the San Diego Consolidated Gas and Electric Co. as salesman, becoming new business manager in October of that year. In 1911 he was named director of the company, and in 1921 became commercial superintendent. He is also a director of the Pacific Coast Gas Association.

Mr. Cannon entered the service of San Diego Consolidated Gas and Electric Co. as Clerk in the consumers billing department, being made assistant cashier and later auditor.

Mr. Peckham was with H. M. Byllesby & Co., from 1911 to 1913, and in 1913 was transferred to the San Diego company. Following two years with the U. S. army, as lieutenant and captain of engineers, he became affiliated with the Tacoma Gas Co., Tacoma, Wash., as assistant general superintendent, returning to San Diego in 1921 as assistant general superintendent.

Construction Program of P. G. and E. Calls for $5,000,000 Expenditure

The construction program of the Pacific Gas and Electric Co., San Francisco, Calif., contemplates the expenditure of over $5,000,000 in the gas department, largely for gas transmission and distribution extensions and replacements in 1932.

Thirty-one separate projects will utilize some 300 miles of pipe, varying in size from 2-inch to 8-inch, the majority of which will probably be 3- and 4-inch. These jobs will be widely distributed over the entire system of the company.

Fifty miles of 26-inch line from San Francisco to Milpitas is also projected at a construction cost of approximately $2,000,000. There will be numerous small items of plant overhauling and repairing, all of which are included in the $5,000,000 total.

The line to tie in Marysville, Oroville, and Chico, and surrounding points now using manufactured gas, with the natural gas system which reaches its northern-most point at Sacramento, is not now under serious consideration for this year.

Annual Golf Tourney of Southern Cal. Oil and Gas Men

Three hundred men of the southern California industry gathered at the Brentwood Country Club, Los Angeles, Calif., on February 22, in the fourth annual Brentwood oil and gas tournament.

New Set-Up for Kansas Companies

KANSAS Power & Light Co., Salina, Kan., has been granted permission to operate as a utility in the state of Kansas, and has taken over many of the franchises owned by Kansas Pipe Line & Gas Co. of Salina. The following set-up is now effective for the two companies, which are both subsidiaries of North American Light & Power Co., Chicago:

Kansas Power & Light Co., District No. 1: Headquarters, Salina, Kan., H. J. Roberts, district manager—Abilene, Assaria, Belleville, Beverly, Buhler, Canton, Chapman, Clay Center, Clifton, Clyde, Concordia, Cuba, Delphos, Enterprise, Galva, Gypsum, Hope, Inman, Lindsborg, Marquette, Medicine Lodge, Mentor, Miltonvale, Morganville, Moundridge, Munden, Pretty Prairie, Salina, Scandia, Tescott, Vining, Cunningham and Industry. Gas has not yet been turned on in Vining and Cunningham.

District No. 2: Headquarters, Manhattan, Kan., H. W. Patten, district manager—Axtell, Baileyville, Beattie, Belvue, Blue Rapids, Frankfort, Hanover, Home, Irving, Junction City, Manhattan, Marysville, Ogden, Onaga, Rossville, Seneca, Silver Lake, St. George, St. Marys, Wamego, Washington, and Waterville.

District No. 3: Headquarters Great Bend, Kan., R. T. McGee, district manager—Bison, Bushton, Belpre, Claflin, Ellinwood, Garfield, Gorham, Great Bend, Hoisington Holyrood, Kinsley, LaCrosse, Larned, Lewis, Loretto, Lorraine, Olmitz, Otis, Pfeifer, Macksville, Russell, Seward, Timken, Victoria and Walker. Gas is soon to be turned on in Belpre, Holyrood, Lorraine, and Macksville.

Kansas Pipe Line & Gas Co. will serve the following towns: Barnes, Blaine, Delia, Emmett, Grantville, Greenleaf, Haddam, Hoyt, Lecomton, Linn, Mahaska, Morrowville, Narka, Oskaloosa, Ozawkie, Perry, Valley Falls, Wheaton and Westmoreland, all in Kansas, and Brady, Keystone, Maxwell, and Ogallala, Neb. Gas has not yet been turned on in Oskaloosa and Ozawkie. E. R. Duree is general manager for both companies, F. P. Dicus, superintendent of distribution; Jas. A. Bell, new business manager; and W. J. White, construction engineer.

Natural for Domestic St. Louis, April 1

LACLEDE Gas Light Co., St. Louis Mo., which has filed with the Missouri Public Service Commission at Jefferson City, Mo., rate schedules for mixed natural and manufactured gas, estimates that the new rates would save St. Louis gas users an aggregate of $617,000 a year. Of this amount $522,374 will apply to the domestic consumers, $59,142 to domestic heating consumers and $35,504 to industrial users of gas. Company officials estimate that revenues of the gas company will be reduced from $7,581,579 to $6,694,557.

The Laclede company plans to obtain its supply of natural gas from the Missouri Industrial Gas Co., which, like the Laclede company, is a subsidiary of the Utilities Power & Light Corp. According to the present plans the Mississippi River Fuel Corp., which constructed a pipe line to St. Louis about two years ago, will furnish the gas to the Missouri Industrial Gas Co.

The minimum charge under the new rate schedule is 75c, with additional charge of 1.5 per therm for delayed payments.

Domestic heating service will be charged for according to cubic foot of building volume, 45c per thousand cubic feet and a secondary rate of 6c per therm of all gas used in excess of the initial amount.

E. P. Gosling, newly elected president of the Laclede organization, estimated that adjustment of gas burners can be made and the gas turned into the mains by April 1, if the new schedule of rates is adopted. He said that gas for household use will be furnished on the therm basis rather than the cubic foot. The charge for the first two therms will be 80 cents; for the next 28 therms, 14.1c; for the next 300 therms, 11.2c; all over 930 therms, 9c.

Suit vs. Lone Star in Oklahoma Dismissed

THE Lone Star Gas Co. and Community Natural Gas Co., of Dallas, Texas, and associated companies doing business in Oklahoma were vindicated of charges brought against them in district court in Jefferson county on February 18, when the suit brought by Governor Murray for receivership and to revoke the charters of the Lone Star Gas Company, Communtiy Natural Gas, Meridian Gas and Guthrie Gas Service companies, was dismissed in the Jefferson County District Court by Eugene Rice, district judge. Counsel for the governor filed notice of appeal to the state supreme court. In dismissing the suit Judge Rice dissolved the temporary receivership he had previously ordered against the companies and announced that he would decline to forfeit the charters of the companies to operate in Oklahoma. Judge Rice did not allow the evidence to reach a jury which had been impaneled to hear the case. He disposed of allegations of discrimination in rates and that false returns had been made to the Oklahoma Corporation Commission and Tax Commission by holding that these were subjects for consideration of the corporation commission. When the suits were filed, it was stated that their chief purpose was to accomplish a reduction of gas rates in 26 cities and towns in Oklahoma served by the companies involved in the action.

The court held that the companies apparently had complied with all of the laws in reference to foreign corporations and that ownership by the Lone Star Gas Corp. of the stock of the operating companies would not constitute a violation of the state's laws.

May Extend Gas Service to Victoria's Suburban Territory

Victoria Gas Co., Ltd., Victoria, B. C., a subsidiary of the British Columbia Electric Power & Gas Co., Ltd., of Vancouver, is reported to be planning an extension of service to Saanich, Oak Bay and Esquimalt. Data are now being prepared and a survey run to determine the number of potential consumers in the area.

1932 Calendar

March

Oklahoma Utilities Association—14th Annual Convention, Tulsa, Okla., March 8-9, 1932.

April

Distribution Conference — American Gas Association Technical Section, Ninth Annual Convention, April 6-8, 1932.

Mid-West Gas Association—Annual Convention, St. Paul, Minn., April 11-13, 1932.

Southern Gas Association—Annual convention, Tutwiler Hotel, Birmingham, Ala., April 19-21, 1932.

Missouri Association of Public Utilities—Annual Convention, Elms Hotel, Excelsior Springs, Mo., April 28, 29 and 30, 1932.

May

Natural Gas Department, American Gas Association—Annual Convention, Tulsa, Okla., May 9-11, 1932.

June

Canadian Gas Association—25th Annual Convention, Fort Garry Hotel, Winnipeg, Manitoba, Can., June 9 and 10, 1932.

July

Michigan Gas Association—Annual Convention, Grand Hotel, Mackinac Island, Mich., July 5-7, 1932.

August

Pacific Coast Gas Association — Thirty-ninth Annual Convention, Spokane, Wash., August 23-26, 1932.

October

American Gas Association—Annual Convention, Atlantic City, N. J., October 10-14, 1932.

Arizona Utilities Assn. Will Not Meet for 1932 Convention

At a meeting of the executive board of the Arizona Utilities Association held on February 6, it was decided that the Association will cancel its plans for the 1932 convention. The decision was reached as an economy measure. It is the intention of the board to hold executive meetings monthly to discuss problems arising from time to time, according to C. H. Webber, president of the Association.

To Construct Lateral to Serve Mendota from Texas-Chicago Line

Plans for supplying Mendota, Ill., with natural gas through a branch line from the main line of the Natural Gas Pipe Line Co. of America are under way, with construction scheduled to start early in March. The line would be approximately 15 miles long, and would leave the main line at a point near LaSalle. Illinois Northern Utilities Co., Dixon, Ill., serves Mendota with coal gas at the present time.

C. A. Shafer District Manager for Coos Bay Gas Co.

C. A. SHAFER has been appointed district manager for the Coos Bay Gas Co. at Marshfield and North Bend, Ore., according to an announcement made late in January by H. M. Thomas, general manager of the Northwest Cities Gas Co., Walla Walla.

C. A. Shafer

Mr. Shafer entered the employ of the Pacific Power and Light Co. in 1921 at Lewiston, Ida. In 1925 he was transferred to Pendleton, Ore., as chief clerk of the combined gas and electric property of the company, leaving there in 1926 to enter the University of Oregon for a course in business administration. He became affiliated with the Northwest Cities Gas Co. in the General office at Walla Walla, Wash., in January, 1931, and was appointed chief clerk there in June of that year, remaining there until his transfer to the Coos Bay Gas Co. at Marshfield.

Coos Bay Gas Co. is operated by Northwest Cities Gas Co. as an independent company, rather than as a subsidiary. Both are controlled by Lone Star Gas Co. of Dallas, Texas.

Illinois Gas Co. Plans 1932 Merchandising Activities

Illinois Gas Co., Lawrenceville, Ill., which serves Olney, Sumner, Bridgeport and Lawrenceville, Ill., is carrying on aggressive merchandising activities in its territory. Records of the company show a loss of only 6 per cent on gas sales and three meters for January, 1932, over the corresponding month of last year.

On February 1 a house-to-house campaign was begun in each of the four towns, four salesmen calling on a selected list of prospects. A truck painted white is being used in this campaign, the car being called the "Business Booster." The company is also conducting a special house heating appliance sales campaign.

A general renovation of gas mains and distributing systems is under way, the company making tie-ins of dead ends of gas mains and relaying an 8-mile high pressure line between Bridgeport and Sumner. Additional holder capacity is also under consideration in Lawrenceville. The company is a subsidiary of General Utilities Co., and is operating under Thos. W. Logan, receiver.

Great Northern Gas & Utilities Co. to Take "Natural" to Minneapolis

Great Northern Gas & Utilities Co. has been formed, with headquarters in Rand Tower, Minneapolis, for the purpose of bringing natural gas from fields in eastern Montana to metropolitan centers in Minnesota. The 24-inch transmission line would be approximately 580 miles long, and would cost about $20,000,000. It is reported that the company has applied for a 20-year franchise in Minneapolis, and that a new schedule of rates is on file with the franchise application. John Wight of Billings, Mont., is named as secretary of the new organization.

A. G. A. Natural Gas Department Getting Ready for Annual Convention at Tulsa

WITH the A. G. A. Natural Gas Department Annual Convention only about two months away, plans are rapidly shaping up for a program of unusual merit, according to A. E. Higgins, secretary of the Department. Sessions will be held at the Mayo Hotel in Tulsa, Okla., on May 9, 10 and 11, and about 1500 are expected to attend. In working out program details, several subjects of vital importance to the natural gas industry are being considered, among them gas legislation; development of new uses of gas; dealer cooperation from the standpoint of justification of utility selling and rendering service; conservation of natural gas; large diameter transmission lines; customer relations; and municipal ownership of public utilities.

Among subjects will be a talk by H. H. Rogers on "Oil, Gas and the Banks in Relation to the Public Welfare."

Gas Legislation

This subject will be handled by H. O. Caster, manager executive committee, Henry L. Doherty & Co., and will summarize for the laymen of the gas industry the legislative acts and enactments of 1931 which have imposed burdensome taxes and other forms of legislation upon the gas producing, transporting and distributing companies.

Development of New Uses of Gas

This subject, particularly regarding house cooling, house heating and air conditioning and other new uses, both domestic and industrial, will be discussed by two prominent men of the industry.

Dealer Cooperation

It is intended to cover this subject from the standpoint of utility selling and rendering service. LeRoy M. Edwards, Southern Counties Gas Co., Los Angeles, will lead the discussion. A. E. Bettis, president, Missouri Utilities Association, and Oscar H. Fogg, vice-president, Consolidated Gas and Electric Co., and a past president of the A. G. A., will also discuss this subject.

Conservation of Natural Gas

This subject will be presented by two leading natural gas company executives.

Pipe Line Practice

Large diameter transmission lines, pipe line bridges *vs.* multiple lines for river crossings, telephone and dispatching assistance will be among other interesting subjects discussed.

Customer Relations, Advertising

Customer relations, public relations, advertising and what has developed along these lines and what is considered the best practice to be used at the present time will receive extended consideration.

Meeting Electrical Competition

A commercial paper, discussing in detail the best and latest practices of the various companies, with particular attention to meeting the electrical competition the industry is now faced with, will be presented.

Question Box

In which executives will be asked to furnish questions that can be answered clearly and concisely and cover a great range of subjects impossible to cover in the general papers.

E. A. Olsen
Chairman
Arrangements

H. C. Morris
Program
Chairman

General review of affiliated Associations in their program to combat anti-merchandising legislation.

Municipal Ownership of Public Utilities

This paper will present the advantages of private *vs.* municipal ownership.

Committees in charge of the Convention are as follows:

Program Committee: H. C. Morris, Dallas Gas Company, Dallas, Texas, chairman; F. H. Brooks, Northern Gas and Pipe Line Co., Omaha, Neb.; F. C. Brown, Natural Gas Pipeline Co. of America, Chicago, Ill.; R. H. Hargrove, United Gas Public Service Co., Houston, Texas; R. C. Hoffman, Jr., Central Public Service Co., Chicago, Ill.; William Moeller, Jr., Southern California Gas Co., Los Angeles, Calif.; H. L. Montgomery, Cities Service Gas Co., Bartlesville, Okla.; E. L. Munyan, Union Gas and Electric Co., Cincinnati, Ohio; E. F. Schmidt, Lone Star Gas Co., Dallas, Texas.; George Wehrle, Public Service Co. of Colorado, Denver, Colo.; T. R. Weymouth, Columbia Gas and Electric Corp., New York City.

General Arrangements Committee: E. A. Olsen, Oklahoma Natural Gas Corp., Tulsa, Okla., chairman; R. W. Hendee, Oklahoma Natural Gas Corp., Tulsa, Okla., vice-chairman; J. B. Corrin, Hope Natural Gas Co., Pittsburgh, Penn.; P. E. Eddy, Peoples Gas Light and Coke Co., Chicago, Ill.; T. H. Kerr, Ohio Fuel Gas Corp., Columbus, Ohio; F. W. Kirk, Houston Pipe Line Co., Houston, Texas; A. W. Leonard, Panhandle Eastern Pipe Line Co., Kansas City, Mo.; J. R. Munce, Arkansas Natural Gas Corp., Shreveport, La.; W. J. O'Brien, Memphis, Power and Light Co., Memphis, Tenn.; F. F. Schauer, Equitable Gas Co., Pittsburgh, Penn.; J. H. White, Southern Natural Gas Corp., Birmingham, Ala.; W. S. Yard, Pacific Gas and Electric Co., San Francisco.

Publicity Committee: B. F. Pickard, Oklahoma Natural Gas Corp., Tulsa, Okla., chairman; R. J. Daugherty, The Empire Co., Bartlesville, Okla.; John L. Fletcher, Arkansas Natural Gas Corp., Shreveport, La.; Winfield Foster, Peoples Gas Light and Coke Co., Chicago, Ill.; W. C. Grant, Lone Star Gas Co., Dallas, Texas; C. D. Greason, Gas Service Co., Kansas City, Mo.; W. M. Hines, Oklahoma Natural Gas Corp., Tulsa, Okla.; Charles Jordan, Pacific Gas and Electric Corp., San Francisco, Calif.; Reid S. McBeth, Oklahoma Natural Gas Corp., Tulsa, Okla.; Ray Ratliff, Kansas City Gas Co., Kansas City, Mo.; W. D. Thurber, Southern Counties Gas Co., Los Angeles, Calif.

Low Demand Storage Water Heating

(Continued from Page 27)

of customer is not the average; neither is the field the most difficult to sell, as in all probability its saturation point at the present is very high. This class of customer can still be reached with the instantaneous and quick recovery systems. The low demand water heater does not interfere or conflict with their sale. It does, however, offer to the gas company a medium where the largest portion of its market can be reached with the highest and best load factor possible to attain through domestic uses. The average family requirements are such that the 40-gallon heater and the 60-gallon heater will satisfactorily serve a large strata of the field. The customer soon finds how to use its service so that an ample supply of hot water at proper temperatures is obtainable. Some have found with guests, or on the day before washday, that it is desirable to turn the heat control up to approximately 180° so as to have a higher degree water with which to work.

The trend in the electric industry, in promoting their hot water heating possibilities, is in line with the basic fundamentals of the low demand gas water heater. Appreciating the value of off peak water heating load to fill the valleys of their daily peak, the industry is promoting the sale of equipment which will furnish a hot water supply with a low demand, operating over their off peak hours. Education in the intelligent use of hot water service is necessary with this low demand equipment. Those gas companies, accepting the principles of the low demand gas water heater, receive the value of the promotional efforts of the electric light and power industry. Electric competition will develop to large proportions, and with this type of heater the gas industry is placed in an admirable position not only to meet this competition but to make rapid gains in developing a most lucrative field of increased revenue.

It is seldom that a utility is not faced with the problem of peak demands that tax its generating equipment and distribution system for short intervals during the day or season. These peaks have grown through the very nature of the business, and one of the most important and profitable factors in market development is promoting the sales of appliances whose low demand and splendid load factor will fill the valleys. Several companies have made new and most attractive rates for customers who will use this type of equipment. The constant demand automatic water heater ideally meets this need from both low demand and load factor standpoints. The 40-gallon heater when set for 2940 B.t.u. per hour, is very low in demand, as compared with the conventional type heater with a demand of from 40 to 50 feet per hour. In a property having 1,000 heaters with the consumption set at 5 feet per hour, the demand is only 5,000 feet, where with the quick recovery heater, there is a possibility for it to equal 40,000 to 50,000 feet. This difference might mean the saving to the utility of new distribution mains, a new holder or additional generating capacity.

For the immediate future, the greatest market for the low demand heater is where gas is necessarily most expensive, namely, in the manufactured gas territory. Both customer and prospective customer, under ordinary conditions, are dubious over the cost of automatic hot water service.

The low demand heater removes all doubt from the customer's mind, as it offers this service at a cost which the gas company, if desirable, can guarantee—a selling factor which completely breaks down this sales resistance.

Two sources are offered to utilities to increase their cubic foot sales and revenue. One is to sell an appliance, the other is to insure its active use. The latter source is particularly outstanding in the use of automatic water heaters. Should the system cost more to operate than the customer desires, the trend, should he not care to discard the heater, would be to use it as an ordinary tank heater. Surveys have been made by gas companies revealing a surprisingly large number of systems used in this manner. This greatly reduces consumption and lowers the revenue to the gas company. The low demand heater eliminates the possibility of revenue losses by giving the customer a service, the cost of which he knows in advance and is willing to pay.

Where the principles of the low demand heater are accepted in a gas property, a thorough knowledge is essential down through the organization. The salesmen, bookkeepers, cashiers, installation men, shop men, and complaint adjusters all have responsibility in public relations. A thorough understanding by these employees of the principles of this type heater materially assists in its sale and satisfactory operation.

In Spokane, all Thrift heater installations are made with flue pipe connections. However, due to its low gas consumption and large combustion area, some companies in the East make the installations without vent connections if the basement measures 12,000 or more cubic feet. This makes the installation flexible, affording the possibility of locating the heater nearest the piping having the greatest and most frequent hot water demand. This reduces radiation losses and furnishes immediate hot water due to the short run from the heater to the faucet.

One company recommends to the customer that he leave the old tank to be used as a tempering tank for incoming water. This further economizes in the Thrift heater's operation.

Thermostats are usually set at from 140° to 150°. People soon find what degree is consistent with the demands of the home. The thermostat should be set as low as possible in rendering satisfactory service, as this influences a further saving in gas consumption.

It is not recommended for the Thrift heater to be connected to the furnace coil. The hot water supply secured from the furnace coils, although supposed to be free, is far from being such. Many customers believe this is an inexpensive way to obtain a hot water service in the cold months. However, it is costly to the owner. The University of Illinois estimates that 20 per cent of the furnace heat goes to heat the water, one shovel out of five.

Southern Gas Assn. Convention Plans Form

AT A meeting of the officers and directors of the Southern Gas Association held at New Orleans on February 19 and 20, final program details were arranged for the Annual Convention of the Association, to convene at New Orleans May 3, 4 and 5, headquarters being at the Monteleon Hotel, according to late information received from J. M. Stone, secretary-treasurer of the Association.

Among speakers and their subjects scheduled to have a place on the program are the following:

Alexander Forward, managing director, American Gas Association, New York, N. Y., —"Business and Government.'

James F. Orr, United Gas Public Service Co., Houston, Texas,—"Securing House Heating Load."

W. C. Grant, Lone Star Gas Co., Dallas, Texas,—"Employee Customer Relation Course."

Hall M. Henry, The Utility Management Corp., New York, N. Y.,—"Holding the Cooking Load."

W. R. Putnam, Electric Bond & Share Co., New York, N. Y.,—"How Utility Sales Activities Affect Dealer Sales."

D. L. Kahn, president, The Estate Stove Co., Hamilton, Ohio,—"What the Manufacturers Expect from the Gas Companies."

I. C. DeLeon, Master Licensed Plumber,—"Advantages of Dealer Cooperative Merchandising."

The Southern Gas Association has decided to publish a quarterly magazine containing news of the active affairs of the Association, according to Mr. Stone, secretary and treasurer.

W. O. Anderson to Manage Pilot Point Office, Succeeding Dick

W. O. Anderson has been announced manager of the Pilot Point, Texas, division of the Community Natural Gas Co., succeeding Claud Dick. Mr. Dick has been transferred from Pilot Point to Mart, Texas, where he will replace W. I. Cousins as manager. Mr. Cousins has been made service foreman for the company at Bryan, Texas.

Wm. D. Kyser, President of Memphis Companies, Dies

William D. Kyser, president of the Memphis Power and Light Co. and the Memphis Natural Gas Co., died February 1 at his home in Memphis from heart disease. Mr. Kyser was born at Richmond, Ala., 49 years ago, and was educated in the University of Alabama and Cumberland University in Lebanon, Tenn. He was United States Attorney for the western district of Tennessee for many years.

Power Plants in Northern Natural's Territory Use Two Billion c.f. Annually

The annual consumption of natural gas by power plants in the territoroy served by Northern Natural System is 2,033,420,000 cubic feet, the plants having a capacity of 80,000 H.P., annual output of over 130,000,000 K.W.H. and serving 97 towns with a total population of 207,385 with electricity.

Colorado Interstate Gas Co. Reviews Construction Work of 1931

Colorado Interstate Gas Co., headquartered at Colorado Springs, Colorado, reports that pipe lines were completed by the company to five communities and three industrial concerns during 1931 at a cost of $500,000. These transmission lines added 20 per cent to Colorado Interstate's load of the preceding year. During the week of November 28 the company broke its previous peak load record with a daily send out of 488,000,000 cubic feet.

The City of Colorado Springs was the largest new customer contracting for natural service in 1931. Other communities added to the list of towns receiving natural gas from the Amarillo-Denver line are Ordway, Sugar City, Fowler and Manzanola. The three industrial consumers added were the Fountain Valley School, the Colorado Portland Cement Co., Portland, and the American Sugar Beet Co., at Rocky Ford.

To provide natural gas for these towns and industrial consumers, the company constructed approximately 60 miles of pipe line at a total cost of $500,000. The longest pipe line project was the 31-mile lateral to serve Ordway, Sugar City, Fowler and Manzanola. A six-mile line was constructed from the main line to Colorado Springs costing approximately $50,000.

Suburban Utilities Co., Tulsa, Formed by Merger of Three Companies

CONSOLIDATION of three small natural gas utilities into one company and under one management has been announced by C. L. Hester, president and general manager of the newly formed Suburban Utilities Co., Tulsa, Okla.

C. L. Hester

Mr. Hester, who was formerly head of the capital investment department of the Oklahoma Natural Gas Corp., purchased the properties of the C. & T. Gas Co., owned by W. L. Cunningham and Archie Tadder and properties of F. W. Lausen and S. E. Smith.

Suburban Utilities Co. now serves customers between Tulsa and Jenks and in East Tulsa. The company also produces gas, as well as distributing it for retail purposes.

Mr. Hester left the Oklahoma Natural January 1 after 11 years service. He became affiliated with the company in 1920 as mail clerk and since has risen steadily to the position he held upon resignation.

Montana-Dakota Power Co. Announces Personnel Changes

Montana-Dakota Power Co., Minneapolis, Minn., has announced the following personnel changes on its system effective recently: R. W. Petter has been named manager of the Conrad Division, headquartered at Conrad, Mont. George Thompson has been transferred to Sidney from Glendive. He will be superintendent of the Sidney district. L. E. Bleakly, formerly of the Great Falls office, is now heating engineer for the Bismarck district. Jim Phillips, superintendent of the Great Falls Division, has been named manager of Bowdoin Utilities Co., Great Falls, and Bob Naylor, sales manager of Bowdoin Utilities, has been transferred to Glendive, where he has been placed in charge of sales for eastern Montana.

Missouri Assn. Plans Interesting Session

THE twenty-sixth annual convention of the Missouri Association of Public Utilities will be held April 28, 29 and 30, 1932, at Excelsior Springs, Mo. The membership of the association includes virtually all of the privately owned gas, electric, water and electric railway companies in Missouri. About 275 delegates from points throughout the state are expected to attend.

Among the speakers and their subjects will be: "A Message to the Gas Utilities of Missouri," R. W. Gallagher, Cleveland, Ohio, president of the American Gas Association; "Greetings to Missouri Utilities," J. F. Owens, Oklahoma City, Okla., president of the National Electric Light Association; "The Growth of Farm Electrification in Missouri," Dr. E. A. White, Chicago, Ill., director of the Committee on Relation of Electricity to Agriculture; "Public Relations in the Utility Field," Phillip H. Gadsden, Philadelphia, Pa., vice-president of United Gas Improvement Co.

An open forum for discussion of timely utility topics will be held on the evening of April 28. The discussion will be led by C. H. Waring, Kansas City Gas Co., Kansas City, Mo.; M. L. Margenau, Empire District Electric Co., Joplin, Mo.; and L. W. Helmreich, Capital City Water Co., Jefferson City, Mo.

A merchandising session will be held April 30, at which F. M. Rosenkrans, new business manager of the Gas Service Co., Kansas City, and chairman of the Merchandising Committee of the Association, will make a report and speakers will discuss the merchandising situation in various states.

Interesting features will be a motion picture film in colors, "The Lake of the Ozarks," by the Union Electric Light & Power Company, St. Louis, Mo.; and a safety exhibition by the Safety Department of the Kansas City Power & Light Co., Kansas City, Mo.

President A. E. Bettis, Kansas City Power & Light Co., will preside at the business sessions, and will be toastmaster at the annual banquet. Paul C. Ford, Kansas City Gas Co., is chairman of the Entertainment Committee, which is arranging the entertainment program. H. E. Scheark, Kansas City Power & Light Co., is chairman of the Program Committee.

Illinois Towns Scheduled for "Natural"

SEVERAL petitions are before the Illinois Commerce Commission, which affect the bringing of natural gas service to many population centers in the state.

Application for permission to serve natural gas in several cities and towns of its system and a new schedule of rates for natural service are on file by the Illinois Power and Light Corp., Chicago. Jacksonville, Decatur, Danville and Clinton are among other towns named in the petition.

Central Illinois Public Service Co., headquartered at Springfield, has applied for permission to construct and operate a natural gas distribution system in Pittsfield, Carrollton, Jerseyville, Villa Grove, Tuscola and Virginia. The company is also applying for permission to change over to natural gas in Quincy, Taylorville, Pana, Shelbyville, Hoopeston, Beardstown, Canton, Havana and Macomb.

Central Illinois Light Co., headquartered at Peoria, Ill., is asking permission to change its systems in Peoria, Pekin, and South Pekin to natural. The company is a subsidiary of Commonwealth & Southern Corp.

50-Mile Line to Serve Newton, Grinnell and Marshalltown, Iowa

Extension of natural gas from Oskaloosa, Iowa, to Newton, Grinnell and Marshalltown this season is reported under consideration by the Natural Gas Pipe Line Co. of America, Chicago. The 50-mile line would leave the main line of the company at a point near Oskaloosa, and extend northwest to Marshalltown, where it would serve the distribution system of the Iowa Railway & Light Corp., headquartered at Cedar Rapids. The same line would serve Newton and Grinnell, where the distribution systems are operated by the Iowa Southern Utilities Co., of Centerville.

Report Planning of Line to Serve Detroit With "Natural"

Brokaw, Dixon, Garner & McKee, engineering firm of New York, recently called for quotations on 200 miles of 20-inch pipe, which it is reported is part of the preliminary plans of a 200-mile gas transmission line project that may extend from Muncie, Ind., to Detroit, Mich., to be built by the United Light & Power and the Columbia Gas & Electric interests.

The United Light & Power Co. is reported to have an option on the purchase of a portion of the stock of the Panhandle Eastern Pipe Line Co., the major line of which was completed last year from the Texas fields. This move would place the ownership of the line in the hands of Columbia Gas & Electric and the United Light & Power.

The original line of the Panhandle Eastern interests ended at Rockville, Ind., but was later joined to the Columbia system through a line constructed from Muncie to Rockville. The Columbia interests also have a line from the Kentucky fields to Muncie, so any line built to Detroit from this juncture could feed from both the Kentucky and Texas fields.

Frank Kistler Now Director of Oklahoma Natural

Frank E. Kistler, oil man of Tulsa and Denver, has been elected a member of the board of directors of the Oklahoma Natural Gas Corp., Tulsa, succeeding E. C. Deal, according to an announcement by E. A. Olsen, president.

Mr. Deal, former president of the corporation and more recently chairman of the board, has resigned and will retire from the utility business in Oklahoma in order to devote more time to other business interests, it was said.

Mr. Kistler has been appointed also as chairman of the finance committee of the corporation. He is well known in oil and gas circles, and formerly was president of the Refiners and Producers Corp.

Mid-West Gas Sales Conference

Rounding Out the Heating Field

(Continued from Page 23)

These neighborhood stores and shops usually represent a small building investment and a very large percentage of them used other means of heating than the central heating plant.

Recognizing this very large potential market, which could not be reached through the sale of gas designed central heating plants or conversion burners, we entered upon a program about five years ago of securing these homes and stores for gas heat. Important among the types of equipment which we selected to round out our heating activities were the following:

The large enclosed type space heaters with combination radiant and circulation features.

Radiant heaters.

Gas steam radiators.

With the development of the self contained gas unit heaters they were naturally fitted into this program.

Large Enclosed Type Space Heaters

During the past five years the sale of large, enclosed heaters of the combination radiant and circulator type has been pushed vigorously. This type of equipment we have found most important because it more nearly duplicated the heating results obtained in the past by base burners, coal stoves and wood stoves. We found that the transition to this type of equipment from the other types of equipment using fuel other than gas was much more easily accomplished in the mind of the customer by the salesman.

From the standpoint of installation, flue connections were always available, and it became necessary only to run the required gas connection in addition to the removal of the old equipment and the placement of the new.

The large type space heater is flexible in its application in as much as it is made in different sizes ranging from a B.t.u. capacity input of 30,000 to 105,000. The first objective of these campaigns was to convince the customers whom we were endeavoring to reach, that heating by gas was within reach of all, eliminating the popular illusion that gas heat was only for the wealthy. Advertising was designed with this in mind.

It has been proved to us that the best time to open a campaign on this type of heating equipment was the latter part of August, continuing aggressively throughout the early winter months. The largest volume of sales came at the time people were contemplating the setting up of their coal stoves or base burners, as it is the general habit of people to remove this equipment and store it during the summer months.

This selling has been a part of the regular activity of the territory representatives and in no case have we employed special representatives to handle this type of equipment.

It has been necessary, however, to sufficiently train our sales crews in the proper selection of the size of equipment to handle any specified sale of this type. Such training is not complicated and has been absorbed by our sales force to the extent that the results in service have been excellent.

In our territory we find the majority of bungalows and cottages with the living room and dining room connected by an archway, and bedrooms opening off one or the other. A heater of this type will adequately serve the living room and dining room, maintaining a lesser degree of heat in the bedrooms through circulation. This process of heating duplicated the method used previously. When equipment was selected, it was found necessary to have a portion of the heat in the form of radiant heat from refractories in the fire chamber through a mica door, and the balance in circulation. In many cottages it was found that there was considerable infiltration of air around windows and doors, and the effect of radiant heat helped to eliminate cold floors, permitting children to play on the floor and be comfortable.

Results of our experience indicate that heaters having capacity of from 60,000 to 70,000 B.t.u. input embrace by far the majority of sales.

To determine the value of placing this equipment on our lines, we averaged the increase in gas consumption of 100 customers after one heating season. The actual results show an additional load of from 80,000 to 90,000 cubic feet annual consumption of natural gas from each unit placed on our lines. In our own company we have placed approximately 1600 heaters of this type in the past five years. A similar experience is shown by other companies of our associated group and, according to their records, in excess of 20,000 of these heaters have been installed and the estimated revenue returned from this activity alone was more than a million dollars annually, a result which certainly merited the attention and effort involved.

Radiant Heaters

The field of radiant heaters has been a very important one. The part which these heaters play in our heating program is an auxiliary heating to be used largely in the spring and fall months, and on extremely cold days in the winter. In my opinion the radiant heater should not be considered as the major heating equipment, but rather to augment the heating plants now installed, whatever they may be. The premise is very attractive that radiant heaters can be economically used in the spring when intermittent heat is needed, and in the early fall eliminating the necessity of starting the furnace before permanently cold weather sets in. Beautiful designs have been on the market for years at prices within the reach of all customers.

The preferable place, of course, for the installation of a radiant heater is in the fireplace, and their designs were originally worked out with this in view, harmonizing them with the house furnishings and the fireplace. Developments have gone forward, however, and today we find that the majority of radiant heater sales are made not for fireplace installations, but for the heating of that cold room which exists in so many homes.

It has been the practice of our company to sell these heaters and vent them wherever possible. This eliminates complaints of sweating walls, and fumes, and promotes general health and safety. Pipe connections are used instead of copper tubing or rubber hose. This policy provides a safer installation and also insures the use of the heater on the arrival of the first cold day in the fall. When rigid connections are not used the heater is more liable to be shunted to the attic or closet the first warm day of spring, eliminating the possibility of its use.

Some 39,000 of these heaters have been sold and installed in our group of properties, representing an increased annual revenue of well over a half million dollars.

Gas Steam Radiation

There are several conditions under which gas steam radiators can be applied in handling gas heating problems to greater advantage than gas boilers. This is true both for large and small buildings. The primary investment to be made in gas steam radiators is considerably less than a complete central heating plant, due to the elimination of the boiler and a large amount of piping. All the advantages are given of steam radiation and individual or group thermostat controls are readily applicable. The factor of investment is an important one and often is the turning point upon which gas steam radiation is sold as against a central heating plant.

Other factors and conditions which offer selling advantages for the gas steam radiator systems may be enumerated as follows:

1. For intermittent heating conditions, such as where a large amount of heat is needed quickly and only periodically.

2. Where varying degrees of temperatures are desired in different rooms throughout the building.

3. Where heat is needed in a detached room and it would not be economical to connect this room with the central heating plant.

4. Small stores such as the corner grocery, drug store, cigar stores, etc., where a large amount of heat is not needed and it would be impossible to install a central heating plant.

In our own company we have confined our efforts on gas steam radiation largely to stores and industrial installations. Units are available in both vented and unvented radiator types and these should be carefully selected to fit the situation in order that the most satisfactory installation may be made from the customer standpoint.

As in the case of central heating plants, it is our general policy that out heating engineers make careful calculations as to radiation requirements for a given situation, and thus not be left to guess work on the part of the average salesman.

Unit Heaters

The development of gas unit heaters has brought to the gas industry a type of heating equipment which has helped to solve the problem of heating stores and small industries where floor space is valuable. Due to this comparatively recent development, the amount of gas heating load which has been attached through the use of unit heaters is comparatively small. No doubt everyone has a general acquaintanceship with this appliance, but, in order to again bring it to mind, I shall describe briefly the general design of these units.

Gas unit heaters are self-contained, gas fired units, employing a fan for movement of air across the heating elements and adjustable louvers which direct the air flow from the unit. They are designed to be suspended from the ceiling or from wall brackets. These heaters are obtainable in varying sizes and capacities. They are vented from the safety standpoint and are equipped with the usual safety devices. The most satisfactory operation is secured through thermostatic controls, either for individual heaters or a group, so they make a complete heating system. The efficiencies of the unit are exceptionally high.

In our company we have been very successful in working out a great many heating installations which could not have been secured for gas except through the application of the unit heater. It is our view that the biggest factor in the sale of these complete heating systems has been the saving of valuable floor space for the customer.

Canvassing is done and prospects for this type of equipment are secured through our regular selling organization, but each installation must be carefully figured and estimates made to insure complete customer satisfaction.

It has been my endeavor to try to point out the true potentialities of the heating field which can be secured through other types of heating equipment than central heating plants. In my own company's situation we have spent a no lesser degree of effort on the sale of this type of equipment in rounding out the heating field, than we have spent on the sale of gas furnaces and conversion installations. As a result of our continued efforts along this line during the past five years, 30 per cent of the total amount of gas sold for house heating and the revenues secured, comes from the sale of gas through the various types of heating equipment described above, which we have placed on our lines. The true possibilities of this field must be recognized, and it is estimated that in many smaller communities in excess of 60 per cent of house heating gas sales and revenues are derived from the use of gas in the equipment above described.

Sales Conference Highlights . . . .

AMONG the several session topics that on trade relations held particular significance. This was the theme for the afternoon session of Wednesday, February 17 with G. C. Klopf, commercial manager of the North Shore Gas Co., Waukegan, Ill., presiding. Alexander Forward, managing director of the American Gas Association, spoke on "Cooperation from the Industry's Standpoint", Morse DellPlain, president of the Northern Indiana Public Service Co., gave an address on "Trade Relations from the Executives' Viewpoint", and the state association view of trade relations was presented by A. E. Bettis, president of the Missouri Association of Public Utilities, Kansas City, Mo.

Mr. Bettis, from a background of investigation conducted by his association, made a significant contribution on trade relations. He pointed out that there was no trade relations problem during the pioneering period when utilities were creating an appliance market. Dealers have seen the desirability of participating in this market, and the utilities welcome them as sales allies. The greatest obstruction to the success of the average merchant in appliance sales is his failure to change his methods in line with modern merchandising. To quote Mr. Bettis, "The day when a merchant can depend on selling his merchandise merely by opening his doors at 8:00 a.m. and closing them at 6:00 p.m. is past. A desire for the product must be created through proper education—then a service rendered to the consumer to be sure of the satisfactory operation and use of the article. All of this activity calls for a closer relationship between the utility and the dealer, if a satisfactory job all around is to be done." Utilities must not wait for merchandising grievances of the dealer to be brought to them, but must go to the dealer and seek out any difficulties which should be corrected. Dealers in many cases have been misled into the belief that their sales will increase with the utility out of the merchandising business. Company-dealer differences must be settled and mutual confidence established. To achieve this end, said Mr. Bettis, the utilities must demonstrate:

"That they will cooperate with the dealers.

"That such cooperation will be more beneficial, than having the utilities stop merchandising.

"That the experience from the effect of the law in the states where utilities have been prohibited from merchandising, shows the law is not in the interest of the public, but that financial loss has been experienced by many businesses and that the progress and development of some of the most important industries have been retarded.

"The negative reaction we are receiving from Kansas should be conclusive evidence that the utility anti-merchandising law was not a move in the interests of any one, for those who have shown increases do not service and therefore cannot expect to hold the business.

"The curtailment of the splendid service, built up over years of experience and endeavor to give the customer the best possible service at the least possible cost, has not been received favorably. As nearly as can be determined at this time a check of sales in Kansas indicates the small independent merchant, whose cause was being championed by legislating one class out of business to make more business for another class, has been the victim of a miscalculation—the sales being made by the chain stores and mail order houses. It is strange how most of these propagandists, that start to attack a business, always fail to recognize the infallible laws of economics. When the strongest factor in any field is eliminated, the next strongest takes its place. The small dealer can always sell more by cooperating with, than by fighting the larger dealers, and this is especially true in the case of public utilities."

Room for Improvement in Range Market

Some sound observations on conditions existing in the gas range market were made by T. Bullion of the Detroit-Jewel Stove Co. in his remarks on the Wednesday morning session program. He pointed out that few notable changes had been made either in range styles or selling methods in the past 20 years, until two years ago. Then, practically over night, the industry was revolutionized—with many of the usual after effects of a revolution now apparent. Ranges in all colors of the rainbow, and styles as varied as the ideas of their designers have possibly resulted in some stimulus to business, but they have also emphasized a competition between brands which has brought no fundamental benefit to the industry as a whole. Stocks have multiplied, super-abundance of designs has confused the customer, competition has deflated prices. Without profit, promotion and improvement of product are impossible. Adoption of certain standards in colors and sizes, and price advances all along the line would bring general benefit.

Speaking of electrical competition, Mr. Bullion called attention to the 1931 sale of 115,000 electric ranges—15 per cent of the gas range sales, and decried the industry's apparent apathy over these inroads. The cooking load will go the way of the gas iron and lighting loads if replacements continue on this scale. Spreading knowledge of heat control, insulated oven, proper use of gas, and economy of gas fuel is the answer to the problem. Mr. Bullion urged the need for market surveys, vigorously followed up with sales efforts geared to sell value rather than price. High quality range replacements insure the future load. The range replacement process is a constant obligation and basic necessity.

Offense Is Best Defense

In his address on "Our Major Future Sales Problems" Samuel Insull, Jr. called upon the industry to maintain an aggressive attitude toward all sales problems. Necessary defense against industries which are expanding into what have been regarded as basic gas markets such as that of cooking, should not deter sales offensives into new markets. To demonstrate that gas is an aggressive industry, and has no call to fall into a defensive state of mind, Mr. Insull pointed to healthy gains shown in total and per customer sales in recent years. Every sales appeal should carry the implication that gas is a live factor in the modern home and industry, demonstrating that this is truly a gas age.

Ohio Oil Co. Plans Line to Serve Craig, Colo.

The Ohio Oil Co., Casper, Wyo., recently brought in a gas well with production estimated at from 25 to 50 million cubic feet a day in the Craig district of Colorado. The well is three miles southwest of the city, and the company is reported to be planning construction of a transmission line into Craig. H. O. Kapp, field superintendent of the company, states that there is sufficient supply for Craig, and that indications are that the flow is permanent.

Manson Light and Power Installs Air Conditioning in New Office

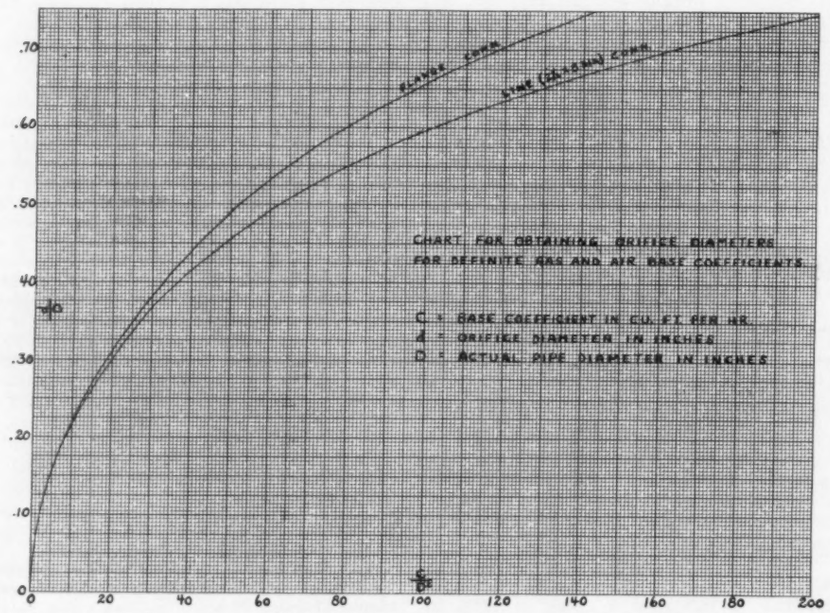
The Manson Light and Power Co. at Manson, Iowa, opened new offices recently, putting into service a natural gas fired air conditioning system. An interesting feature of the installation is that customers coming into the building are saved a trip to the basement to inspect the new furnace by the removal of a portion of the floor. The plant is in full view of spectators on the first floor.

Pacific Lighting Corp. Shows 1931 Net Earnings Gain

Consolidated net profits of the Pacific Lighting Corp. for 1931 showed a gain of $50,659 after all charges, subsidiary preferred dividends and minority interests, with a total of $8,020,125 for 1931 as compared with $7,969,466 for 1930. After providing for preferred dividends of $851,496.60, the profits available for dividends on the common stock were equivalent to $4.46 per share.

Dickson County Oil and Gas Co., Inc. Asks Nashville Franchise

The Dickson County Oil and Gas Co., Inc., has applied for a 40-year franchise to serve the city of Nashville, Tenn., with natural gas from its wells in Dickson County, north of White Bluff, less than 30 miles distant. An election will be held August 4 in Nashville, at which time the franchise will be put before the voters.



Orifice Plates for Definite Base Coefficients

By M. W. Adcock

*Union Oil Company of California**

IT HAS been suggested that a system of making orifice plates of the correct diameters to give base coefficients in round numbers would be more practical than the present custom of making them of definite diameters in inches and common fractions of inches, which in most cases gives a base coefficient in odd numbers. For example, a 3.000-inch plate in an 8-inch line, with 2½ x 8 diameter connections has a base coefficient of 2028 cubic feet per hour. This plate would be replaced by a 2.981-inch one to give a base coefficient of 2,000 cubic feet per hour.

M. W. Adcock

Instead of having plate sizes that vary in steps of ⅛ and ¼ of an inch, the increase in inches would be the amount required to give an increase in the base coefficient of 100, 500, and 1,000, etc. as the case would require. The plates should be marked with both the diameter in inches and the base coefficient in cubic feet per hour.

It is not the purpose of this paper to recommend either system as being superior to the other, but rather to bring the topic up for discussion. However, an attempt will be made to outline some of the advantages and disadvantages of the two systems.

Undoubtedly one of the greatest disadvantages of changing the system of orifice plate sizes is the investment in present orifice plate stocks. However, if a good portion of the stock is in need of re-machining and the percentage of plates that are too large to allow re-machining is not too great, the changing of systems might not be too expensive and would put the stock in much better condition.

Where plates are used interchangeably for gas, liquids and steam a system based on even coefficients for one of them would give odd coefficients for the other two, which in addition to the odd sizes would be a distinct disadvantage.

The meterman's familiarity with plate capacities would be materially increased with the use of plates with even base coefficients, for as he naturally speaks of a 2.000-inch plate having a base coefficient of 995.3 cubic feet per hour as a "2.000-inch plate", he would more than likely speak of a 2.004-inch plate having a base coefficient of 1000 cubic feet per hour as a "1000-cubic foot plate", especially if the base coefficient is stamped on the plate.

The changing of plates to take care of increased or decreased conditions of flow would be greatly simplified with the use of these plates with even coefficients. To illustrate, we will say a meterman has a 2000-cubic-foot plate that gives about the correct differential and he is told that the rate will be increased about 75 per cent. It is a very simple matter for him to decide that a 3,500-cubic foot plate will be the right one to use, thus eliminating the necessity of looking up some table or making a long calculation.

It is also believed that a higher degree of accuracy will be attained in the machining of the orifices where the sizes are in odd thousandths of an inch than if they are in even inches and fractions, for unless the need for accuracy has been thoroughly explained to the machinist it is probable that he will allow a tolerance of a few thousandths of an inch when told to machine an orifice to 2½ inches or some similar size, but if the required size is a dimension such as 2.038 inches the need for accuracy is evident.

The calculation of a base coefficient for a plate of known size is undoubtedly easier than the calculation of a plate size for a definite base coefficient. This is due to the fact that two unknowns, namely the orifice diameter and the Cv factor or velocity coefficient, are required for the last mentioned calculation. This requires the use of the "cut and try method" or a graph in which $\frac{C}{D2}$ is plotted against $\frac{d}{D}$

where

C = Base coefficient in cubic feet per hour
d = orifice diameter in inches
D = actual pipe diameter in inches

To eliminate making these calculations each time an orifice plate is made it would be best to compile all the necessary plate sizes in tabular or data sheet form similar to our present coefficient tables.

*Presented before the Southern California Meter Association, January 28, 1932. The author of this paper is chairman of the S.C.M.A. Standards Committee.

So. Calif. Meter Assn. in Monthly Session

SOUTHERN CALIFORNIA Meter Association met at the Masonic Club, Los Angeles, for its February 25 monthly session, with an interesting program arranged for the membership. Prior to the program of papers President P. W. Hill called for a report on Association golf tournaments, and A. E. DeBurn made announcement of the final play-off for the S. C. M. A.-*Western Gas* Good Fellowship Trophy, due for March 19, just preceding the Association's Hi-Jinks. E. Lorenz, chairman of the entertainment committee, told of plans for the Fourth Annual Hi-Jinks, urging that advance purchase of tickets be taken care of before closing dates.

Two new members were admitted to the S. C. M. A. at the February meeting.

The following features made the program an outstanding one:

Edgar E. Shafer, Jr., of the Gas Research and Engineering Service, gave a paper on "Gas Analysis," with a practical discussion of fractional analysis.

R. F. Angell directed a general discussion on practical measurement topics, participated in by a number of members. Under this head a "gadget" for changing needle points on an Edwards balance, and a new type gravitometer, were described. Two questions were selected for particular discussion—"What 24-hour period is best for the chart reading interval?", and "Are gas gravity balances accurate?"

"Use of Significant Figures in Measurement Work" was the subject dealt with in a paper by E. S. Fuller of the Union Oil Co., as the concluding feature of the program.

S. C. M. A.
Forum of Experience

"Knowledge is built upon the experience of others."

READERS of the Measurement and Control" department of *Western Gas* are urged to take advantage of the services available through this "question and answer" column, which is conducted by the "Q. and A." committee of the Southern California Meter Association. This committee, of which H. E. Thompson is chairman, is a clearing house for new questions on measurement problems, and for answers to questions already published. Send new questions or your answers to the questions which appear below, to S.C.M.A. "Q. and A." Committee, Box 1100, Station C, Los Angeles, Calif.

This Month's Questions

Q. 121. Is the gas gravity balance entirely reliable? N. R.

Q. 122. Is the 50-inch meter recommended over the 100-inch meter? Is the 50-inch meter recommended over the 20-inch meter? R. S. T.

Q. 123. What is the best method for cleaning a glass tube which is dirty from mercury? How is a water column cleaned? G. M.

Q. 124. What is the method of reading a pulsating pressure gauge? Is the correct pressure obtained when the pointer movement is dampened by throttling, or by other means? A. J.

Previous Questions Answered

A. 117. Discussed before the S.C.M.A., this question gave the consensus of opinion that for important measurement, orifice plates should be inspected at least once a month. In some service plates need never be replaced, and therefore need no routine inspection, but at least one inspection is necessary to identify this condition. In general, plates should be inspected often enough to insure that their condition would not degenerate below the standard of accuracy required by the particular service.

A. 118. There are gauges available which compensate for barometric pressure. We know of no recording instrument which records directly in units of absolute pressure, but believe such an instrument would be very desirable and useful. While its design would involve some difficulties, the idea merits consideration; for example, the instrument would be extremely useful in power plant control.

A. 119. Where no pulsation exists, there is no need for throttling a water column, and all valves to and in the column should be wide open. With pulsating flow, throttling a valve in the water column would cause an error in the final gas computation, the same as in the case of an orifice meter. A small gate valve is not desirable for use in throttling any measuring device; for this purpose a needle or globe valve, or some type of dampening device, is recommended.

A. 120. To recover mercury that has emulsified with oil as a slate-colored paste, or that has broken up into a mass of small globules that refuse to go together, first wash with gasoline, then dry with cloth, then add a little concentrated nitric acid. This will clean the surface and bring all small particles together. Then wash off the surface with an abundance of clean water.

S.W.Gas Measurement Course, Apr.26-28

THE eighth annual Southwestern Gas Measurement Short Course will be held at the College of Engineering, University of Oklahoma, Norman, Okla., April 26 to 28, 1932. These dates were announced January 28 by W. H. Carson, professor of mechanical engineering at the university and director of the gas measurement course. The course is sponsored by the College of Engineering, of which J. H. Felgar is dean, assisted by the Oklahoma Utilities Association and the Corporation Commission of Oklahoma.

At a meeting of the general committee in charge of this project, of which B. L. Maulsby of the Oklahoma Natural Gas Corp. is chairman, preliminary details of the project were worked out. W. R. McLaughlin of the Arkansas Natural Gas Corp., Shreveport, La., is chairman of the Program Committee; R. D. Turner of the Skelly Oil Co., Tulsa, chairman of the Practical Methods Committee; G. P. Estill of the Oklahoma Natural Gas Corp., Tulsa, chairman of the Committee on Publication of Papers, and D. C. Williams of Kay County Gas Co., Ponca City, chairman of Committee on Exhibits.

Sessions will open Tuesday morning, April 26, with registration from 8:00 to 9:00, followed by a General Assembly, presided over by Mr. Maulsby. E. F. McKay, manager of the Oklahoma Utilities Association, will introduce Dr. William Bennett Bizzell, president of the University of Oklahoma, who will give the Address of Welcome. Featured on this program are addresses by R. E. Miller, secretary of the Natural Gasoline Association of America, A. E. Higgins, secretary of the Natural Gas Department of the American Gas Association, and the session closing with a talk by E. F. Schmidt, general superintendent of the Lone Star Gas Co., Dallas, on "Gas Measurement as a Profession."

During the General Assembly on Thursday, April 28, several features of special interest will be presented, including an address on "The College of Engineering and The Gas Measurement Short Course," by J. H. Felgar, Dean of the College of Engineering; an address by R. S. J. Pigott, chairman of Fluid Meters Committee of the American Society of Mechanical Engineers; a paper by J. J. Hassler, engineer of the Oklahoma Corporation Commission; and a Report of the Committee for Study of Practical Methods by R. S. Turner.

Modern measurement and control equipment will be thoroughly explained by manufacturers' representatives at the afternoon study periods throughout the course.

Exhibits are restricted to equipment in use in the Mid-Continent field, having direct relation to gas measurement.

Registration for the course in 1931 numbered about 400 representing 20 states.

Gas Measurement Short Course Committee. Standing, left to right—A. J. Kerr, E. W. Roland, E. E. Stovall, B. L. Maulsby (Chairman), J. H. Felgar. Sitting, left to right—E. F. McKay, W. R. McLaughlin, C. B. Day, W. G. Carson, Eugene Metz.

F. W. Thompson

A. E. DeBurn

Effective Operation of Gas Odorizing Apparatus

By F. W. THOMPSON

and

A. E. DEBURN

Pacific Pipe & Supply Company

PENETRATION of natural gas into new service areas, as well as many points hitherto served with manufactured gas, has given the subject of odorization increasing importance, and much progress has been made in this comparatively new branch of distribution technique. A paper covering recent developments in odorizing practice, prepared by F. W. Thompson and A. E. De Burn, and read by Mr. De Burn, was given on the program of the 11th Annual Meter Short Course and Conference at Ames, Iowa. The paper was presented under the title "Safety in Gas Distribution", and reviewed the need for odorizing, the development of odorant materials and injection devices. Successful odorizing results obtained in Denver, Colorado, were dealt with in some detail through presentation of data provided by Geo. Wehrle, superintendent of the gas department for the Public Service Co. of Colorado. Of special interest was the section devoted to fundamentals underlying the design and operation of odorizing equipment, covered in the following abstracts from the paper.—*Editor.*

EFFECTIVE odorization must be continuous and maintain a constant odorant-gas ratio. The injection of a definite volume of odorant per hour to a varying gas sendout cannot give uniform results.

Economical odorization, and the desirability of maintaining a constant odorant-gas ratio, requires an automatic injecting device which will proportion the odorant to the constantly fluctuating flow of gas.

The operating principle of the Papico System involves use of two orifices in parallel, one in the gas stream and one in the odorant liquid line. With a constant static pressure the differential pressure across the gas line orifice is a measure of the volume of gas; this differential pressure, being also across the odorant liquid orifice, serves to maintain a flow of liquid proportional to the flow of gas. For any given odorant-gas ratio there is, therefore, a definite ratio between the two orifices.

The differential pressure at which the Papico system is to operate will depend largely on the conditions of the installation. Since an orifice plate in the gas line is preferably used, although any definite restrictive means such as a throttle valve is satisfactory, an existing orifice meter run makes an ideal and economical location for the odorizer. In such cases the differential pressure is determined by the range of the orifice gauge and the size of the odorant orifice is calculated either from the differential pressure or from the size of the existing gas orifice. It is desirable for best operation not to have too small a differential at minimum gas flow; if possible not less than 1 inch of water. There is no upper limit to differential pressure for the odorizer, and consideration here must be influenced by the pressure drop that can be permitted. Where maximum and minimum flow do not vary widely, 10 inches of water differential pressure at maximum flow is considered good practice. The size of the odorant liquid orifice may be calculated by either of two methods, first from the size of the gas line orifice, or second from the value of the differential pressure.

First Formula

$$d_2 = 0.00111 \times d_1 \times \sqrt{G} \sqrt[4]{P}$$

where

d_2 = the diameter of the odorant orifices inches

d_1 = the diameter of the gas orifices, inches

G = gallons of odorant per 1 MM. cu. ft. of gas

P = absolute pressure of gas, lbs. per sq. in.

Second Formula

$$d = 0.0000667 \frac{\sqrt{R \times G}}{\sqrt[4]{h}}$$

R = Rate of flow of gas (cu. ft. per hr.)

h = Differential in inches of water across liquid orifice.

The formulae are calculated for 0.6 gravity gas and for an odorant gravity of 40 degrees A.P.I. Variations from these values will, of course, alter the constant in the formulae.

The odorant gas ratio may be readily checked by means a calibrating tube in the apparatus. This value is calculated from the following formula:

$$G = \frac{3{,}600{,}000{,}000\ V}{T \times R}$$

where

V = Volume of calibrating tube (in gals.)

R = Rate of flow gas (cu. ft. per hour)

T = Observed time required for calibrating tube to fill (in seconds)

G = gallons of odorant being added per 1,000,000 cu. ft. of gas.

If changes in this ratio are desired the size of the odorant orifice can be easily changed.

The location of the odorization equipment is a local problem dependent upon the layout of the individual distributing system. In certain instances it is desirable to control odorization individually by districts; in certain cases the whole city may be cared for at the city gate measuring station with centralized control. Individual district control permits varying degrees of odorant concentration, governed by local conditions of the distributing system or consumer.

When introducing odorant at a regulator station individual cases must determine whether the injection should be above or below the regulator, depending on the line pressure. Adjacent to transmission lines the odorant is usually injected below the regulator, while in distribution systems if the pressure is reduced too low before odorizing, sufficient pressure drop for the proper control of the proportional equipment may affect the distribution.

The cost of odorization depends on the location and the volume of gas, but the average is approximately one-tenth of a cent per thousand cubic feet of gas.

The companies distributing natural gas who are odorizing consider it a sound investment, because it reduces "unaccounted for" and is a safeguard against the dangers of employee and consumer liability, and greatly helps to maintain public confidence in gas as a safe fuel.

Newspaper Groups Oppose Ban on Sales

STATE press associations in the Mid-Continent and Southwest territory, which are closely following the workings of anti-utility merchandising legislation in Kansas and Oklahoma, are now emphatically aligning themselves against this type of statute. A resolution was passed by the Kansas State Press Association at its January 16 meeting in Wichita, calling for the repeal of the act passed in 1931 in Kansas, in these words:

"On the grounds of depriving cities and towns of adequate service and contributing to empty store rooms and unemployment, we urge the repeal by the next Legislature of the law known as the Public Utility Merchandising Act, believing its operation has been a detriment rather than a benefit to our communities."

In Kansas the result of this legislation, and the decline in advertising and sales promotion which it involved, has been a distinct slump in the merchandise volume.

Anticipating the possibility that similar legislative attempts might be made in Texas, the Texas Press Association is profiting by the Kansas-Oklahoma example. In the last issue of its official publication, the "Messenger and Bulletin," information is submitted to the membership indicating that Kansas newspapers have lost more than $250,000 in advertising revenue during the year the law has been in force, and that sale of gas and electric appliances has fallen off by 62 per cent, the majority of the appliance business going to chain stores. The public has suffered, since no service goes with the sale, sub-standard merchandise is sold, and installment terms are not available. Conditions in Oklahoma were stated to be substantially the same as in Kansas.

Utility advertising in Texas for 1931 was estimated at $1,250,000, the greater part being in appliance advertising. It has been clearly demonstrated that when the utilities are barred from merchandising the consequent decline in sales promotion through advertising is not made up through retail advertising, there being little if any increase in the latter.

In the Texas Press Association statement the legislation is branded as "not only discriminatory, but unjust, unfair, and detrimental to open business."

Foxboro 20-Inch Meter Described in Bulletin 176

In Foxboro's latest publication, Bulletin No. 176, entitled "Orifice Meters for Gas," attention is given to a description of the Foxboro 20-inch meter.

Among the other features of this bulletin are a complete section on construction details of Foxboro meters; a section describing the use of Foxboro meters with 2½ and 8 pipe diameter connections; a description of the special use of the meter with 0-10 square root charts; and a page describing other instruments used in gas measurement service.

Copies of this bulletin will be sent to gas measurement engineers or to anyone interested in gas flow measurement by addressing a request to the company at Foxboro, Mass.

The Flow of Gas in Distributor-Feeder Mains

(Continued from Page 31)

tions (1) and (2) transposed in the terms of the pressure drop, gives,

$$h = \frac{Q^2 SL}{3550^2 K^2 D^5}$$

$$h = \frac{411^2 \times 0.7 \times 307}{3550^2 \times 1.816^2 \times 1.3887^2}$$

$$h = 0.453 \text{ inch}$$

Similarly on Yates Avenue from Oro Street, south, where there are nine bleed-offs, h = 0.557 inch.

From this it may be seen that the allowable pressure drop through the distributor-feeder on Oro Street must not be greater than 1.000 inch minus 0.557 inch equals 0.443 inch. Therefore, transposing equation (4) in terms of pressure drop,

$$h = \frac{SL}{3550^2 K^2}\left\{\frac{Q^2+Q_i^2}{D^5} - \frac{Q_i^2}{n^5} + \frac{QQ_i}{3}\left(1-\frac{1}{n^3}\right)\right\} \text{ -------(8)}$$

Since there are 15 bleed-offs,

$$h = \frac{805 \times 0.7}{3550^2 \times 22.95^2}\left\{\frac{2558^2+(968+411)^2}{27218} - \frac{(968+411)^2}{15} + \frac{2558\,(968+411)}{3}\left(1-\frac{1}{15^3}\right)\right\}$$

$$h = 0.352 \text{ inch}$$

The greatest pressure drop between the feeder main and the last consumer supplied is 0.557 inch plus 0.352 inch equals 0.909 inch, water column which does not violate assumption 4, and, therefore, constitutes a satisfactory solution of the problem.

Suppose, however, the approximate form of Q_e (5) were used, then,

$$h = \frac{SL}{3550^2 K^2}\left(\frac{Q^2+Q_i^2}{D^5} + \frac{QQ_i}{3}\right) \text{ -------(9)}$$

substituting and solving,

$$h = 0.363 \text{ inch.}$$

The error in this case would be 0.363 inch minus 0.352 inch equals + 0.011 inch.

It may be seen from the above that for average distributor-feeders, where they do not too closely resemble feeders, the approximate form (9) is accurate enough for practical calculations.

New Orifice Fitting by Byron Jackson

BYRON JACKSON CO., Los Angeles, Calif., has just announced a new orifice fitting for the accurate measurement of gas. This new product, termed the BJ Duplex Orifice Fitting, incorporates as its outstanding feature two interchangeable orifice plates—of any specified orifice diameter, or one blank—contained within a single fitting. This "duplex" arrangement, according to the manufacturer, provides extremely accurate metering by using the two plates with different sized orifices when a fluctuating load must be measured, and also accurately measures small flows, as of pilot lights and small burners.

BJ Duplex orifice fitting.

Where a fixed orifice is required, with the new device, a blank plate can be installed in reserve in the upper chamber for use in an emergency, providing the operator with a single-disc valve. A padlock may be applied to lock this blank plate in position, providing a tamper-proof shut-off when service has been discontinued.

A further feature of the duplex arrangement of plates is the ease with which they can be changed. According to the makers, the operation of changing to a plate with an orifice of different diameter may be accomplished by an inexperienced worker in less than one minute, by a turn of two cranks with the change-wrench. An indicator tag furnished with each plate shows the diameter of the orifice in metering position and of the one in reserve.

The body of the fitting is cast from a special corrosion-resistant nickel semi-steel. The shut-off valve is of the pressure-seal, wedge type, constructed of bronze, and requires no lubrication. A sediment chamber and tamper-proof locking feature are provided. Flanges and meter tap arrangement are of standard specifications.

Due to the compactness of the fitting the manufacturer recommends it for installations where space is limited, as in manholes, basements and complicated piping set-ups.

Each fitting is given a hydrostatic test, establishing a proper safety factor above the recommended working pressure. Two types are manufactured — one for working pressures up to 150 pounds, and another for 500-pound pressures.

An illustrated folder containing complete details is available by addressing Byron Jackson Co., 2150 East Slauson Avenue, Los Angeles, Calif.

City of El Dorado to Hold Election for Municipal Gas

The City of El Dorado, Kansas, plans to hold an election to decide on the construction of a municipal gas distribution system as soon as the source of supply of natural gas for the town is determined. Cost of such a system would be approximately $220,000.

Specifies Gas Equipment for New Federal Building

The supervising architect of the new Federal Building at Bartlesville, Okla., has called for the installation of gas fired equipment in the new building. Bartlesville Gas & Electric Co. will supply the gas. The building will be ready for occupancy about June 1.

Service to Packing Plants to Begin About March 1

Service to Omaha packers was expected to begin about March 1, from the 18-inch 16-mile high pressure extension from the main line of the Northern Gas and Pipe Line Co., Omaha, Neb. Armour & Co., the Cudahy Packing Co., and Swift & Co., late in February, were bringing to completion their lateral lines from the plants to the city limits, where the new 18-inch line terminates.

These packing plants will use more than 10,000,000 cubic feet of gas daily, which is more than the daily output of the manufactured gas plant at Omaha, and equivalent in heat value to nearly double the output of the city plant.

Michigan Gas Wells Can Supply 2,811,000 Consumers

According to figures compiled by the Geological Survey Division of the Department of Conservation of Michigan, gas wells now operating in the state have sufficient daily capacity to supply natural gas for all domestic uses for 947,000 families, or approximately 2,811,000 consumers. These figures show that operating gas wells in the state have a daily capacity of about 75,000,000 cubic feet.

H. E. Dorrill Now Manager for U. G. P. S. at Orange, Texas

H. E. Dorrill is now manager for United Gas Public Service Co., at Orange, Texas, replacing J. C. Woods. Mr. Dorrill was formerly with the New Braunfels office of the company.

Replace Sherman, Texas, Mains

Replacement of gas mains in Sherman, Texas, costing approximately $24,000 was completed by the Municipal Gas Co. late in January. About three months were required for the work.

Okla. Utilities Assn. Ready to Convene

THE final program for the Fourteenth Annual Convention of the Oklahoma Utilities Association is now complete and gives promise of features of practical value and interest to the representatives of gas, electric, water and railway utilities of the state attending. The New Hotel Tulsa has been chosen as convention headquarters and sessions will cover a two-day period, March 8 and 9.

The opening meeting will be presided over by S. I. McElhoes, president of the Association, and will feature greetings from several associations. Greetings of the American Gas Association will be brought by Kurwin R. Boyes, New York, secretary.

Two featured addresses are scheduled for this session—T. J. Strickler, Kansas City, vice-president and general manager of the Kansas City Gas Co., Kansas City, Mo., and chairman, Natural Gas Department, A.G.A., will give an address under the title, "Two Trillion Cubic Feet," and H. H. Smith, Tulsa, secretary of the Mid-Continent Oil and Gas Association, has the subject "Cost of Government."

Tuesday afternoon will feature a joint session of the several divisions and delegates will hear subjects which hold a community interest for all. Paul A. Walker, chairman of the Corporation Commission of Oklahoma, will talk on "The Corporation Commission and the Public," and Kurwin R. Boyes will give an address on "Where the Customer Takes Our Measure"; this feature will be followed by a discussion. W. H. Bagley, Oklahoma Natural Gas Corp., will lead the discussion for the Gas Division.

"Appliance Merchandising in Oklahoma—1932" will be the subject of an address by William Parkerson, general commercial manager of the Public Service Co. of Oklahoma, Tulsa. A discussion to follow this will be led by W. J. Young, Oklahoma Natural Gas Corp., and C. A. Breitung, Southwest Gas Utilities Corp., Ada.

The Association's annual dinner will be held at 7 P. M. on March 8, with J. F. Owens, president of the Oklahoma Gas & Electric Co., as featured speaker.

On Wednesday morning, March 9, the several divisions of the Association will meet in joint session to discuss problems of interest to utilities in general. Among the speakers scheduled for this session are S. I. McElhoes, who will talk on "Legal Phases of the Franchise Problem," and G. S. Adamson, commercial manager, Oklahoma Power & Water Co., who will give a paper on "Net Revenue Possibilities—1932."

The general Business Session of the Convention will be brought to order on Wednesday afternoon, at which time committee reports will be given and the election of officers for the coming year will take place, followed by a talk by the new president and closing remarks by the retiring president.

Just prior to the convention, on March 7, several teams will take part in a first aid and safety contest at the convention hotel. Men's teams will represent the Oklahoma Natural Gas Corp., Oklahoma Power and Water Co., Oklahoma Gas & Electric Co., and Southwestern Bell Telephone Co. The women's team demonstration will be given by representatives of Oklahoma Natural.

First and second prizes will be awarded to the men's team; individual prizes to members of the winning team, and to members of the women's team.

Gas Utility Revenues Down 5 Per Cent in 1931

Revenues of manufactured and natural gas utilities aggregated $649,019,772 during 1931, as compared with $682,353,203 during the preceding year, a decline of 5 per cent, according to reports from companies representing nearly 90 per cent of the utility distribution of manufactured and natural gas, it was announced by Paul Ryan, chief statistician of the American Gas Association.

The manufactured gas companies reported revenues of $373,225,622 for the year, a drop of 2.8 per cent from a year ago, while revenues of the natural gas concerns totaled $275,794,150 or approximately 8 per cent less than for the year 1930.

Sales of manufactured gas reported for 1931 totaled 349,146,454,000 cubic feet, a decline of 2.6 per cent, while natural gas sales for the year were 678,433,837,000 cubic feet, a drop of 9 per cent. Natural gas sales for industrial purposes declined from 230,830,346,000 cubic feet in 1930 to 202,957,869,000 cubic feet in 1931 a drop of approximately 12 per cent.

For comparison with other fuels, the production of bituminous coal during 1931 declined by nearly 18 per cent from the preceding year, anthracite coal production dropped more than 15 per cent, crude petroleum output was down 5 per cent, coke production down nearly 30 per cent, while the production of electric power declined by 4 per cent.

Colorado Gas & Utilities Co. Bought by United Companies

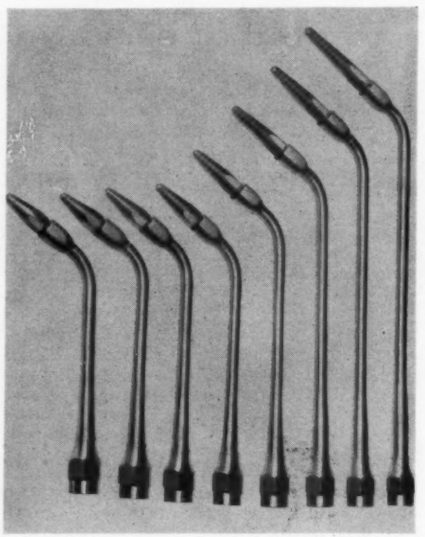
The United Companies, Abilene, Kan., have taken over the Colorado Gas & Utilities Co., headquartered at Denver, Colo., and operating in several eastern Colorado and western Kansas towns, following completion a year or more ago of a natural gas transmission line to Lamar, Colo., from the Hugoton field in southwest Kansas. Operation of the company will continue under the name of the Colorado Gas & Utilities Co., and there will be no change in the operation of the properties or changes in personnel with the exception of the directors, which are now also executives and directors of the United Companies. The new directors of Colorado Gas & Utilities Co. are as follows: C. L. Brown, L. O. Verckler, W. S. Morrison, A. J. Hardendorf, L. L. Stone, Sam R. Heller and E. E. Anderson. Mr. Brown is also president of The United Companies, Mr. Verckler, executive vice-president, Mr. Morrison operating vice-president and H. R. Rhorer, secretary treasurer. Mr. Hardendorf is president of Colorado Gas & Utilities Co.

Obtaining Rights of Way for Geneseo-Milwaukee Extension

The Natural Gas Pipe Line Co. of America, Chicago, is now asking rights-of-way for its major extension from the Texas-Chicago line which will leave the main line at the Geneseo compressor station and extend northeast through Illinois and southern Wisconsin to Milwaukee. Floyd C. Brown is general manager for the company.

New Oxweld Welding Heads by Linde Air Products Co.

A NEW series of welding heads with detachable tips has been introduced by The Linde Air Products Co., 30 East 42nd Street, New York, N. Y., for use with the Oxweld Type W-17 welding blowpipe. These will supplement the one-piece style heads for this blowpipe, so that the user will have a choice of two types of welding heads.



New welding heads with detachable tips for Oxweld Type W-17 blowpipe.

The new detachable tip heads were developed particularly for pipe line welding and for production operations. The new tip produces the same type of flame as that produced by the one-piece welding head for the Type W-17 blowpipe. Sizes No. 6 to 13, inclusive, are available in the new welding heads.

Northern Gas and Pipe Line Co. Serving 128 Towns and Cities

With the bringing of natural gas service to Wells, Dodge Center and Kasson, Minn., towns now served by the Northern Natural System number 128. These communities are served by the district office of Minnesota Northern Natural Gas Co., a subsidiary at Wells, of which Alexander Peterson is manager.

The total number of towns now served by distributing divisions of the Northern Gas and Pipe Line Co. totals 49, 21 in Nebraska, 15 in Kansas, 9 in Iowa, and 4 in Minnesota. The balance of the 128 are served wholesale by the company. The system now has a total of 1909 miles of pipe line, practically all of which is now in service.

N. J. Clark, Vice-Pres. of Republic Steel, on Pacific Coast

N. J. Clark, vice-president in charge of sales for the Republic Steel Corp.. was on the Pacific coast during the month of February, and while in Los Angeles was the guest of George Emanuels, district sales manager for the company.

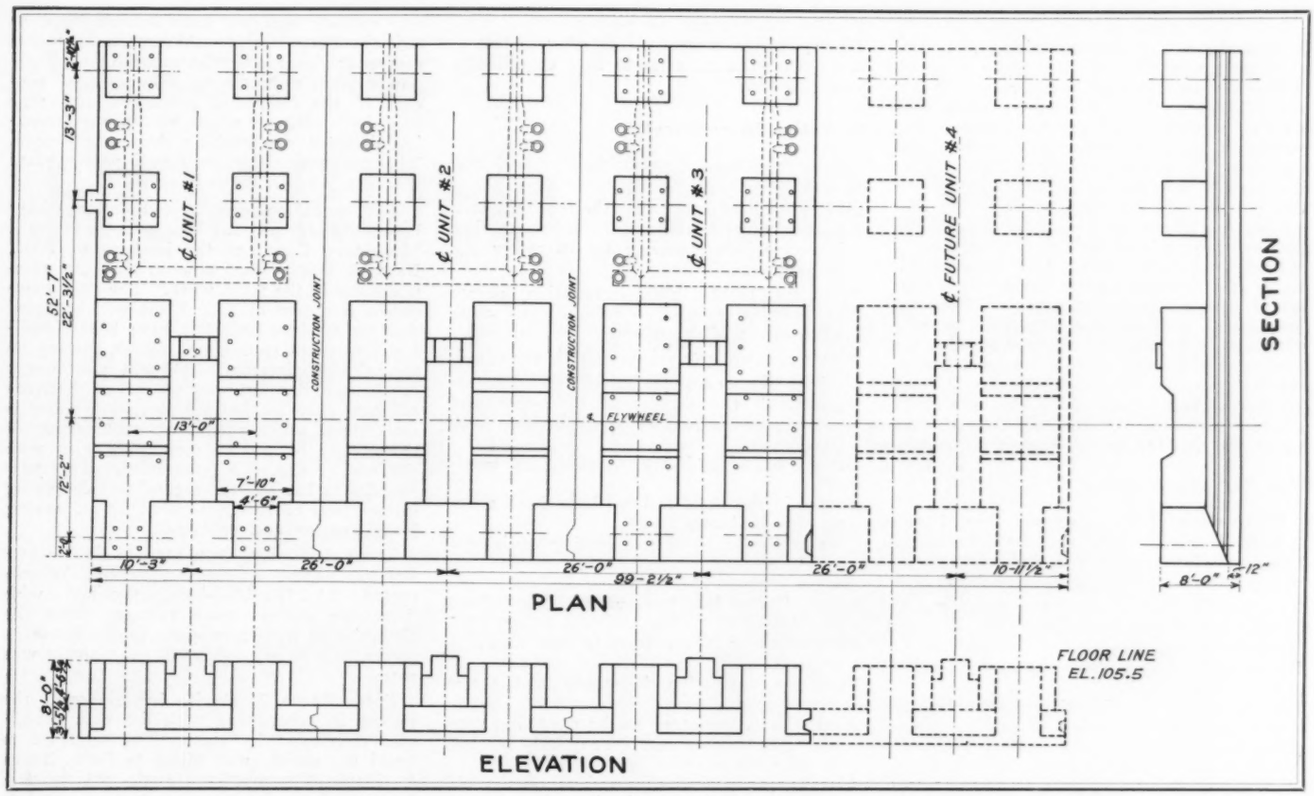


FIG. 5

New Trends in Compressor Station Design

after passing through the building wall, bend downwards to the basement floor, then upwards through the operating floor, to the inlet flanges of the compressors. Discharge connections come from the compressor outlets, on the outer sides of the units, and parallel the suctions, making the same bends. Outside of the building they continue straight until past the suction header, then bend 90° towards the unit center line and combine in an enlarged unit header. The combination of vertical bends within the building and horizontal bends below ground relieves the expansion stresses and makes the use of expansion joints or special expansion bends unnecessary. Each compressor connection, both suction and discharge, is provided with two hard-metal trimmed gate valves, having a vent between them, so that the danger of gas seeping past the closed gate valve may be eliminated when the piping within the building it disconnected.

Connections are taken from each unit header to its unit gas cooler and to a transfer header below the coolers. Inlets and outlets of gas coolers and connections to the transfer header are valved, so that gas discharged by any compressor unit may be transferred to any cooler, or by opening all of these valves, the pressure may be equalized ahead of the coolers and the load distributed among them. The transfer header, like the Hot Gas Header on Fig. 1, is subject to expansion when transferring gas from one unit to another cooler, but as it connects only to the unit headers, which in turn are free to move, the expansion stresses are absorbed before reaching the coolers or compressors and without ill effects upon the

(Continued from Page 26)

piping itself. All valves are so located that, although the piping and the valve bodies are buried in the ground, thus avoiding vibration troubles, the handwheels and glands of the valves are above ground and accessible. The sizes of large valves are reduced by specially designed long taper nozzles, which recover the velocity heads. Forged steel welding fittings are used for all shop fabricated pieces, but all field joints are lap steel flanges. In general the gas piping conforms to the standards of design and materials for a medium high pressure, superheated steam installation.

Air intakes and exhaust lines are of welded steel construction. They are carried close under the operating floor, straight out through the building wall to the air intake hoods and exhaust mufflers set in line 12 feet from the building. The air intakes are screened and set quite low. The exhaust mufflers are on sliding rails to take care of expansion and each is provided with a tall stack discharging at an angle away from the building, so as to avoid contaminating the intake air.

Compressed air at 200 pounds for starting the engines is furnished by two single stage compressors with motor drive, located in the pump house. They discharge into a small line leading across the valve yard and through the station to the 4-inch air header hung in the basement alley, on the engine side of the building. From this header short connections are taken to the starting post of each engine and to the starting-air storage tanks, which are located outside the adjacent building wall, thus making the length of pipe from tanks to engines exceedingly short. All air piping is welded construction.

Fuel gas is taken from the suction header at the permanent end of the building by a valved connection running to the regulator house. The arrangement of the regulating and metering equipment is new and unique. The size of the house is reduced to 5 feet square. The two high pressure regulators are placed, one above the other, close to the left side, as one enters; the two low pressure regulators are similarly placed to the right. The meter is mounted against the back wall, facing the door. Flanged nipples are bolted to both flanges of each regulator and pass through the front and rear walls, being supported by the girts of the building, located at the correct heights for that purpose. External to the building each nipple is valved and connected to one of four vertical headers at each corner of the building. These vertical headers constitute the inlet and outlet manifolds and the valves make it possible to use either or both regulators of each pair at will. Placing the valves external to the building is a safety feature of considerable value. The vertical header at the left rear corner, the high pressure outlet, drops straight into the near end of a volume tank made of a random length of 12-inch pipe, and buried in the ground, to avoid temperature fluctuation. A 3-inch meter run is taken from the far end of this tank to ensure dampening of pressure variations, and brought below ground to connect into the vertical header at the right rear corner, i.e., the low pressure

inlet. The meter orifice is thus directly behind the meter and the differential connections are simplified and easily drained. The left rear and right front vertical headers, which constitute the outlets from each pair of regulators, are provided with safety valves of adequate capacity to relieve and maintain the pressures only slightly above the desired working range and prevent undue pressure rises that might affect the regulators and the control of the engines. All fuel gas piping is of welded construction.

Each main compressor has its own oil sump and filtering system entirely self-contained, the pumps being operated from the cam shaft. The make-up oil system includes a storage tank adjacent to the driveway, for tank truck delivery. A small connection with regulating valve is taken from the starting air header and admits air to the tank at 10 pounds pressure, forcing oil through the oil supply header to the engine oil sumps.

Cost Reduction Features

Comparison of the diagrams, Fig. 1 and 2 will show the following features which have served to reduce the first cost:

Reduction in size of compressor buildings.
Reduction in size of auxiliary buildings.
Elimination of concrete hot-well.
Simplification of compressor foundations.
Reduction in size of water piping, by halving the water system.
Shortening and simplification of water piping and consequent reduction of friction losses.
Reduction in capacity and head of pumps.
Need for only one spare pump, by adjustment of the conditions to make the same characteristic suitable.
Modification of the gas piping.
Reduction of gas valve sizes by use of swedges.
Simplification of fuel gas piping.
Shortening of main compressed air piping by relocation of tanks.
Welded construction of piping.
Elimination of central oil filtering system.
Reduction of auxiliaries to half of ultimate requirements.

Operating Improvement

Improvement of operation has been effected as follows:

Recirculation of water over the cooling tower to obtain lower temperature in hot weather is accomplished merely by operating the spare pump.
All pumps of the initial installation operate at practically rated conditions and peak efficiency, with consequent reduced cost.
Water pressure at various units is equalized.
Straight line construction of gas headers eliminates the danger of blow-outs and consequent destruction so inherent in bent headers.
Greater flexibility in the use of the gas headers.
Breaks in the hot gas lines have been practically eliminated.
Greater flexibility of gas cooling equipment is obtained.
All gas valves are accessible for operation.
Valve boxes for gas valves have been avoided.
Pressure drop from starting air tanks is negligible.
Fuel gas regulation is steady and meter charts good.
Auxiliaries are nearer to the operating centers of the station and more quickly reached in an emergency.
All the advantages of the best of the old designs have been retained.

Figs. 3 and 4 show plan and cross-section of the Richland station as actually constructed. Some further economies were effected by reason of conditions peculiar to the site. It was found that the Louisiana Power & Light Co. served the vicinity of Alto with two entirely separate high tension lines, so that the danger of a prolonged outage was removed; this rendered a stand-by auxiliary power plant unnecessary. Similarly, as several of the interested producers and pipe lines had adequate shops within easy trucking distance, no machine shop was needed. The entire machine shop and power plant building was therefore omitted.

The main compressor foundations have been redesigned by the Worthington Pump & Machinery Corp., at the instance of Ford, Bacon & Davis, Inc., so as to eliminate complications in the form work. The new foundation is shown by Fig. 5. It will be noted that the various pedestals have been simplified into plain rectangular blocks, resting on the raised engine mat. The mat is no longer continuous in fact, but is keyed between adjacent units so that the continuous effect is maintained, while permitting each section of the mat to be poured monolithic with with the rest of the unit foundation. This new foundation has effected a considerable saving in the costs of forms, as well as the saving in excavation and concrete.

Three 1,250 h.p. twin tandem double acting gas engine driven compressors, Worthington 24 x 36 x 15½-inch, together with three gas coolers were released from the Pickens and Reform stations of the Southern Natural Gas Corp. All other equipment was new.

Ford, Bacon & Davis, Inc. designed the station in accordance with the new principles developed by them. The contract to build the station was given to Ford, Bacon & Davis Construction Corp., which performed all work, excepting the subcontracts for erection mentioned above, and completed the station in less than 90 days from the date the contract was signed. This speed of construction and greater economy of design were perhaps the most notable features of the Richland Compressing Station.

Longest Piece of Pipe Made in Republic Mills

THE longest single piece of pipe to be made without circumferential welds was recently fabricated in the mills of the Republic Steel Corp., Youngstown, Ohio. The length of 8-inch pipe shown above measures 285 feet, and was made from a single continuous length of plate. Republic electric weld pipe is formed cold from the flat plate, the weld being made by the resistance method without the addition of foreign metal, and having the same strength as the body of the pipe.

Fabyan Petroleums Limited Negotiating to Supply Regina

Fabyan Petroleums Limited, Vancouver, B. C., is negotiating to supply cities in Saskatchewan with natural gas from the Fabyan field in Alberta. The Fabyan field is located near the Wainwright field just east of Edmonton, and the line to supply Saskatoon, Regina and other cities would be more than 350 miles long. According to an engineering report on the Fabyan field there is a large open flow production there at the present time, four wells having been brought in with an average open flow capacity of 15,000,000 cubic feet per day each, and if the company's plans develop, further drilling would insure an adequate supply. It is estimated in the report that the sendout would be approximately 12,000,000,000 cubic feet per year in the cities of Saskatoon, Regina and Moose Jaw.

New Rate Schedule Goes Into Effect in El Paso, Texas

A new rate schedule saving gas users in El Paso, Texas, approximately $28,000 went into effect with the February bills issued by the Texas Cities Gas Co. The rates apply to users of more than 3,000 cubic feet of gas monthly. The city reserved the right to conduct investigations at any time.

According to Henry C. Morris, president of the company, during the first year of natural gas service in El Paso his company lost $107,141, as compared with the last year on manufactured gas. The average customer used 3,500 cubic feet a month of manufactured gas, for which he paid $5.25, according to Mr. Morris. The equivalent in natural gas service would be 1,800 cubic feet, costing $2.55.

An analysis of small accounts shows that the consumers in El Paso using 3,000 cubic feet or less per month are served at a loss. The report of the city's engineers, Burns & McDonnell, stated that, should any reduction be made, it should be consumption of 4,000 cubic feet per month and over.

The schedule will effect a reduction to approximately 85 per cent of the customers at one time or another during the year.

Coax those HOARDED DOLLARS out of hiding

You can —with these 1932 ESTATES!

The styles of TODAY at prices of LONG AGO

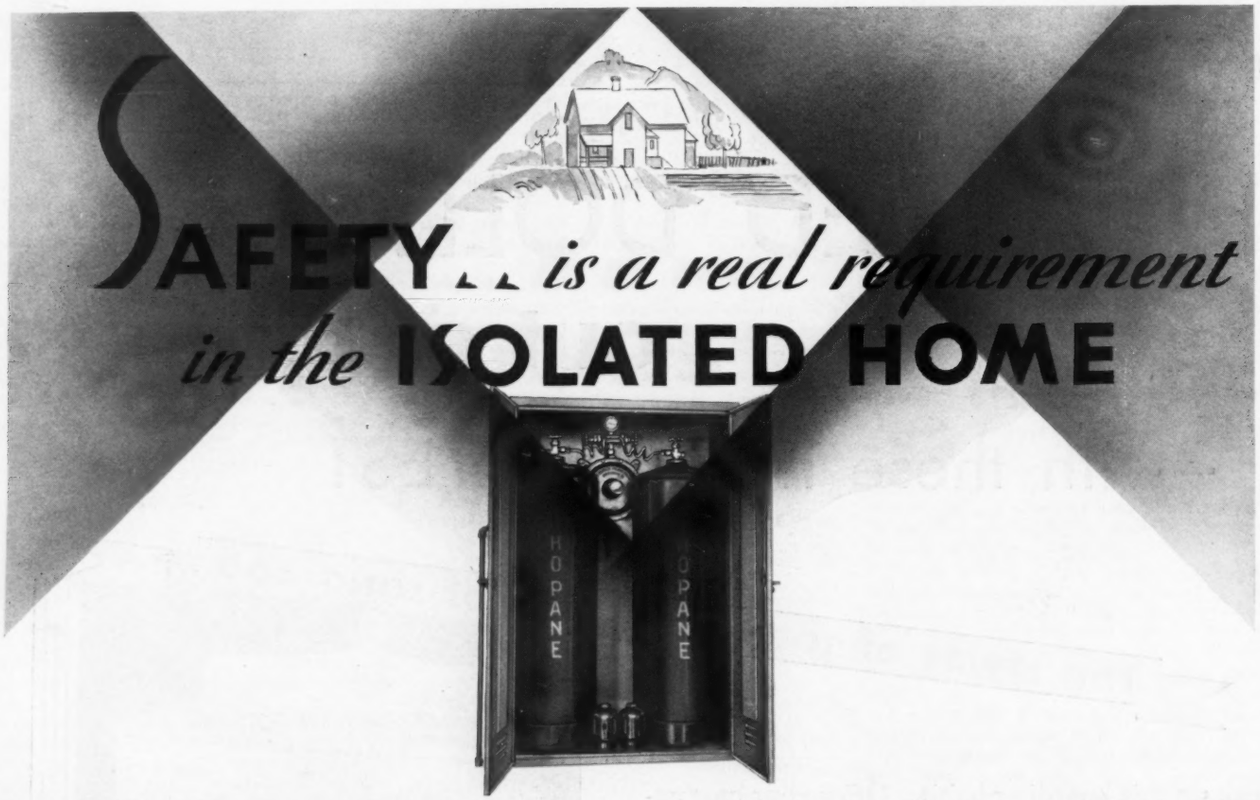
Break up this hoarding habit. Offer your customers merchandise that's so attractive, so much better, that they become dissatisfied with what they have. *That's* the way to coax out those hidden dollars.

That's what you can do with these new 1932 Estate Gas Ranges! So radically *different* that they make old gas ranges look still older. So radically *improved* that they antiquate even yesterday's gas ranges. Eight models in the line—in a size, style and finish to fit every kitchen. All with many important, exclusive features—all with heavily insulated ovens and all-enamel finish—and all priced to make those backward dollars come forward. Write for deluxe catalogue, which is also a retail sales proposition, to The Estate Stove Company, Hamilton, Ohio.

180 NEW MONTGOMERY STREET
SAN FRANCISCO, CAL.
TERMINAL SALES BUILDING
PORTLAND, OREGON
737 SOUTH HILL STREET
LOS ANGELES

Estate GAS RANGES

WITH THE OVEN THAT BAKES WITH FRESH AIR



JUST as the propane gas engineer brings a very necessary and unique service to the isolated country home, so does Kerotest offer a very complete service in propane valves, fittings and manifolds.

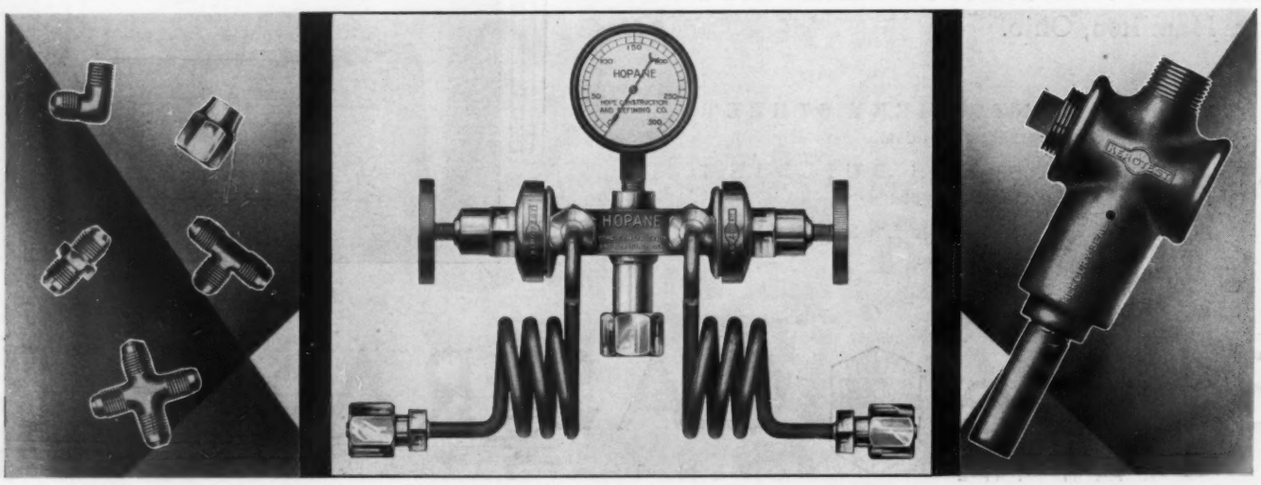
For example, the Kerotest "Hopane" Manifold illustrated below, is the perfected result of years of development. Note the ready accessibility of handwheels . . . the pressure-tested valves of forged brass with diaphragms of monel metal, specially formed to insure flexing from open and closed positions.

In addition there is the Kerotest Cylinder Valve (Series 133) a masterpiece of 21 years development . . . equipped with triple monel metal diaphragms . . . tested by the Underwriters Laboratories to withstand 11250 pounds per square inch . . . so designed that years from now every part may be individually serviced at minimum cost.

You will find Kerotest a happy discovery in valves for propane gas service. Write for descriptive circular.

KEROTEST MANUFACTURING CO.

PITTSBURGH, PA.



BUTANE - PROPANE NEWS
Covering Liquefied Petroleum Gas Service

Butane Installation for Peak Loads at San Diego

By J. A. HARRITT

Superintendent Gas Production
*San Diego Consolidated Gas and Electric Company**

IN 1930, The San Diego Consolidated Gas and Electric Co. conducted experimental operations on a full plant scale, whereby oil gas of varying quality was enriched with butane vapor to the standard of 550 B.t.u.

The experiment developed that an increased plant capacity of 20 to 25 per cent is readily obtainable by the enrichment method at a greatly decreased cost of installation, as compared to the cost of additional generating and accessory apparatus for oil gas manufacture.

J. A. Harritt

Experiments also indicated that an increment of fully 10 per cent of butane-air gas of 550 B.t.u. can be added to our oil gas without interfering with satisfactory utilization.

Based upon the information obtained from these experiments, this company decided upon the use of butane as an economical and satisfactory method of solving the peak load problem.

The enrichment method increases the unit cost of gas very slightly, and will be the method commonly used.

The butane-air gas will be added only in extreme emergency, due to its high unit cost as compared to the cost of oil gas produced in a large plant.

The enrichment method contemplates the manufacture of oil gas of about 510 B.t.u. and the addition of sufficient butane vapor to maintain the required 550 B.t.u.

The Butane Plant

The storage system, at present, comprises five 15,000 gallon tanks shown in Fig. 1. These tanks are 8 feet in diameter and 45 feet high, with concave bottoms and crowns. They are constructed of 51/64-inch, 50/64-inch and 49/64-inch flange steel in the shells, with 7/8-inch steel bottoms and crowns. Each crown is equipped with a 24-inch manhole, fitted with a 2-inch steel manhole cover in which are located all the various nozzles for gauges, valves, thermometer, relief valve, etc.

Except for the manhole cover which is bolted down, the tanks are entirely of arc-welded construction. The nozzles in the cover are screwed and welded. Every inch of weld is depicted by X-ray photographs. The tanks are designed for a working pressure of 150 pounds per square inch, with a safety factor of 5. Each one without equipment, weighs 23 tons.

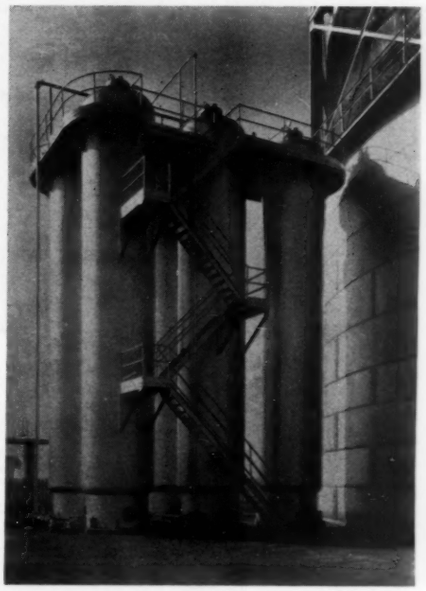


Fig. 1

Liquid is drawn from the bottom through a 2-inch line, and vapor is taken from the top through a 4-inch line to the proportioning and mixing equipment, about 500 feet distant. At the tanks a 2-inch pipe riser connects the vapor line from the top with liquid line from the bottom. This riser has 1/4-inch valves, spaced 1 foot apart, to serve as a liquid level indicator, thus avoiding the use of steel shells.

All piping is extra heavy and of welded construction. Where flanges are required, they are of steel, screwed and welded.

All valves are of the Merco-Nordstrom type.

Inlet and outlet liquid lines are equipped with meters. These are shown in Fig. 2.

A motor-driven pump is provided to pump the liquid from tank cars to storage tanks, with a pressure balancing line from the top of the tanks to the tank car. Full tank pressure, whether liquid or vapor, is carried throughout the system to the point of vapor utilization.

At this point, we have a steam heat exchanger, for the conversion of liquid to vapor, or we can use vapor direct from the storage tanks, in either the enrichment or butane-air process.

From the vaporizer separate 4-inch lines convey the vapor to the proportioning machines and to the enrichment control apparatus.

Enrichment Apparatus

Vapor at full pressure is taken from the vaporizer, or storage tanks and reduced to

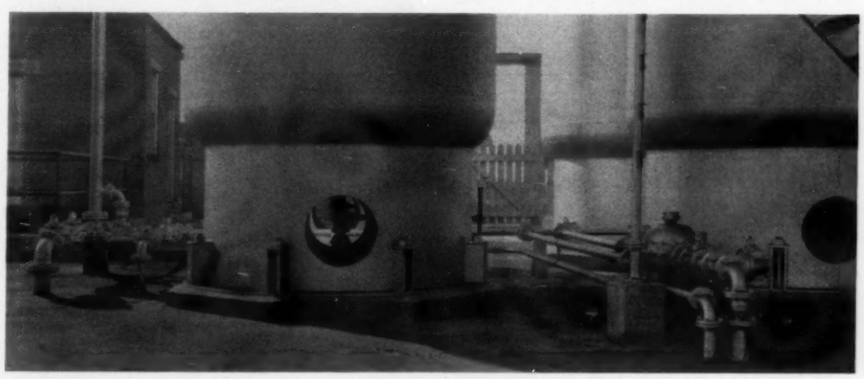


Fig. 2

* Presented at the Mid-Winter Conference of the Pacific Coast Gas Association at Los Angeles, Calif., Feb. 17 and 18, 1932.

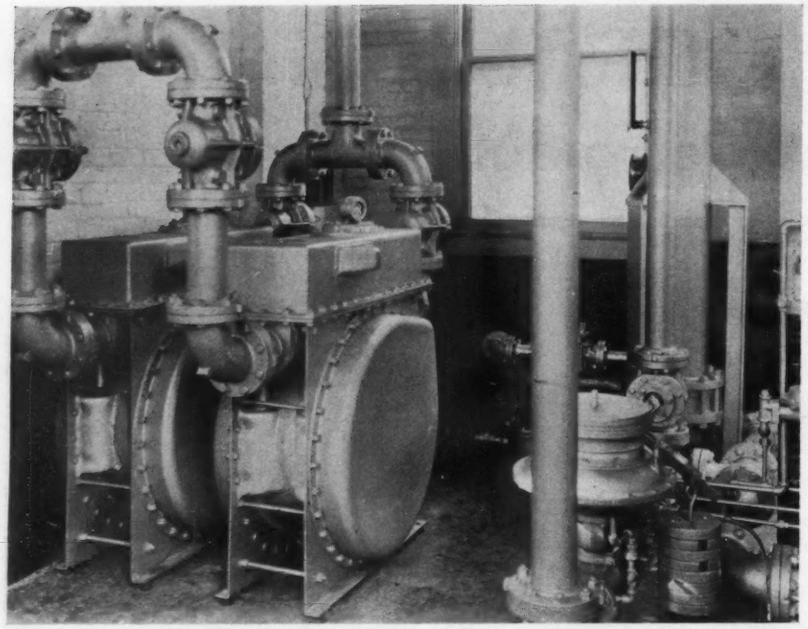


Fig. 3

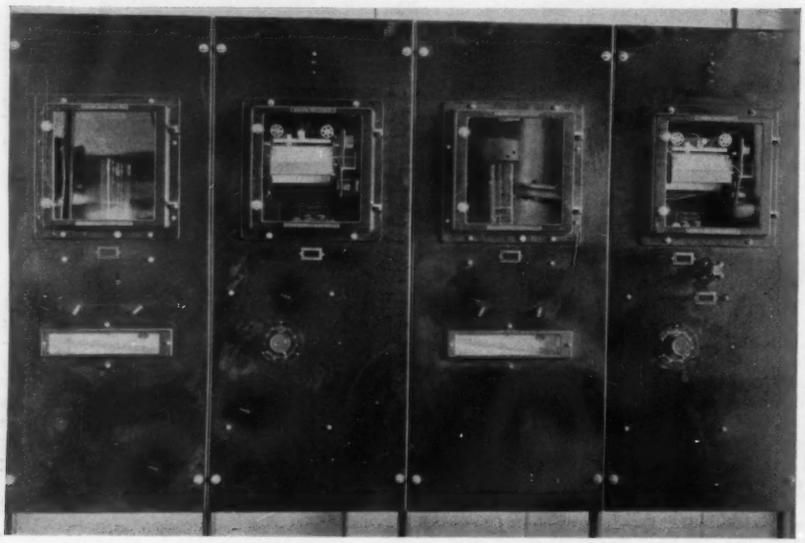


Fig. 4

5 pounds pressure through a Reliance regulator, whence it passes to a second Reliance regulator reducing to a normal pressure of 15 inches water column. It is then metered through 4-inch Emco diaphragm meters, all of which apparatus is shown in Fig. 3, and passed through the automatic control valve for the maintaining of a proper calorific value of the gas entering the holders.

Leaving the control valve, the vapor passes into a 30-inch oil gas main, through a 4-inch nozzle containing 120 3/8-inch holes, where all oil gas en route to the various holders, after passing the various station meters, is forced into intimate contact with the incoming vapor.

The automatic control used is shown in Fig. 4. It actuates an electrically operated control valve, shown in Fig. 5, with an additional cutoff valve to insure against any flow of vapor when the control valve is in the closed position.

The automatic control is supplied with mixed gas and vapor taken from the line before the gas flow divides on its way to the various holders. Thus all gas in storage is of a standard quality, at all times.

Butane-Air Proportioning Machine

This apparatus is shown in Fig. 6.

As in the enrichment process, the pressure of the vapor is reduced in one step to 5 pounds and in a second step to a normal pressure of 15 inches water column through two Reliance regulators.

To maintain proper proportions of vapor and air we have a 10-inch exhauster drawing free air and a 4-inch similar machine drawing vapor at the normal pressure of 15 inches, changeable at will to compensate for the calorific value of the vapor being used. These exhausters are driven by silent chain drives from a single motor at the required speeds to supply a mixture of 20 per cent vapor and 80 per cent air at the normal pressures. The vapor pump has a capacity of 25,000 cubic feet per hour, and the air pump has a capacity of 100,000 cubic feet per hour, or a total of 3,000,000 cubic feet of gas per day.

The vapor and air pumps discharge into a receiver 30 inches diameter by 9 feet high where the air and vapor meet and are forced into intimate contact by baffle plates.

From the receiver the butane-air gas is conveyed through a 10-inch pipe to a rotary gas meter, whence it passes into the regular oil gas mains. This gas can also be passed through the automatic enriching apparatus where it can be standardized, or if already above standard, it will act as enrichment for the lean oil gas.

With a maximum oil gas capacity of 20,000,000 cubic feet per day, it is conservatively estimated that the enrichment method adds 4,000,000 cubic feet and the butane-air process provides an additional emergency supply of 3,000,000 cubic feet, or a total of 7,000,000 cubic feet, amounting to 35 per cent.

The total cost of the installation is about 25 per cent of the estimated cost of an oil gas installation of equal capacity.

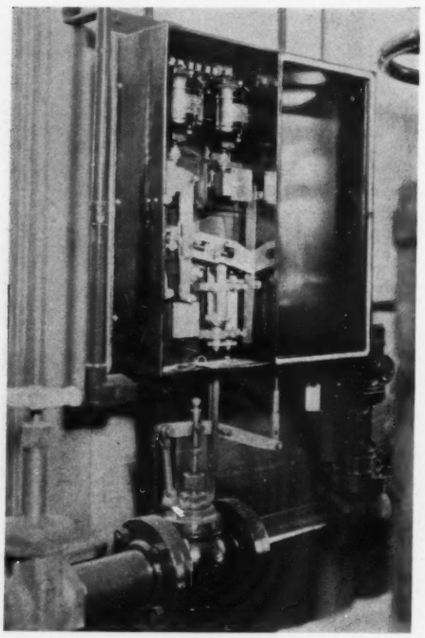


Fig. 5

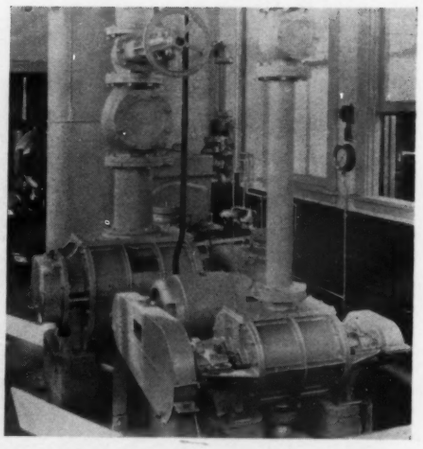


Fig. 6

Liquefied Gas Sales Up 58 Per Cent

AN INCREASE of nearly 10,500,000 gallons, representing a gain over 1930 sales of 58 per cent, brought the 1931 marketed production of liquefied petroleum gases to a total of 28,502,819 gallons, according to the United States Bureau of Mines, Department of Commerce, following the completion of a survey of 1931 operations by E. B. Swanson, chief petroleum economist. The 1931 increase exceeded that recorded for 1930, when marketed production was approximately 8,000,000 gallons higher than in the preceding year.

In two previous surveys, the Bureau of Mines has reported the quantities marketed annually from 1922 to 1930, inclusive, thus giving, with the 1931 survey, a complete record of the marketed production of these gases.

MARKETED PRODUCTION OF LIQUEFIED PETROLEUM GASES, 1922-1931

Year	Gallons
1922	222,641
1923	276,863
1924	376,488
1925	403,674
1926	465,085
1927	1 091,005
1928	4,522,899
1929	9,930,964
1930	18,017,347
1931	28,502 819

An approximate segregation of the gases marketed indicates that the 1931 distribution of propane was about 15,000,000 gallons, as compared with 11,500,000 gallons in 1930 and that the distribution of butane, pentane and the mixtures of these gases more than doubled, being about 13,500,000 gallons in 1931, as compared with 6,500,000 gallons in 1930. Information assembled in the survey shows that shipments made in cylinders and drums totaled approximately 14,000,000 gallons, while bulk shipments were slightly more than 14,500,000 gallons. Bulk shipments were made by tank truck or car and by pipe line. Some portion of these bulk shipments was used by distributors in filling their own cylinders for local distribution.

Marketed production in the Pacific Coast States, reported by four companies, totalled 5,056,362 gallons, while the marketed production east of the Rocky Mountains, reported by 10 companies, totalled 23,446,457 gallons.

Segregation of the 1931 marketed production, according to the three principal types of use, showed that 54 per cent was marketed for domestic uses; 24 per cent for industrial and miscellaneous purposes; and 22 per cent for gas manufacturing, either as a raw material for gas manufacture or as an enriching agent.

SEGREGATION BY USES OF 1931 MARKETED PRODUCTION

Use	Gallons	Pct.
Domestic	15,294,648	53.7
Gas Manufacturing	6,184,655	21.7
Industrial and Miscellaneous	7,023,516	24.6
Total	28,502,819	100.0

It is estimated that approximately 150,000 "bottled gas" customers were served during 1931, as compared with 117,000 during 1930, 55,000 in 1929 and 20,000 in 1928. An average consumption of approximately 100 gallons per installation was indicated.

Through the American Gas Association, it was learned that 118 communities in 28 states were supplied with liquefied petroleum gas by 59 companies at the close of 1931. Undiluted gas was distributed in 24 communities by seven companies, the remainder being butane-air plants. One butane-air plant was reported operating in Canada. In comparison with installations in operation at the beginning of the year, when 59 plants were reported, an even 100 per cent growth is indicated.

Several companies reported an extension of marketing territory during the year. New developments reported include the employment of liquefied petroleum gases in cotton singeing and the use of liquefied petroleum gas as a fuel and refrigerant for motor trucks designed for the transport of perishable commodities.

Four companies began producing and marketing liquefied petroleum gases during 1931, bringing the total number to 14, one company previously producing having reported no 1931 production.

Personnel Changes for Natural Gas Corp. Organization

A number of changes in personnel have taken place in the properties served by Natural Gas Corp. of Oregon and Natural Gas Corp. of Washington during the past month, according to A. E. Strong, general manager of both companies.

Among these have been the transfer of W. E. Berry, formerly representative at Anacortes, Wash., to Klamath Falls, Ore. W. E. Evans of the service department at Port Angeles, Wash., has been promoted to the position of representative at Anacortes, succeeding Mr. Berry.

Robert H. Rush of the service department at Coquille has been promoted to the post of representative in the same community, as has Norman Coleman, who is now representative at Bend, Ore.

Ward D. Hopkins, who has been representative at Bend since the plant was first placed in operation, has been transferred to a similar position at La Grande.

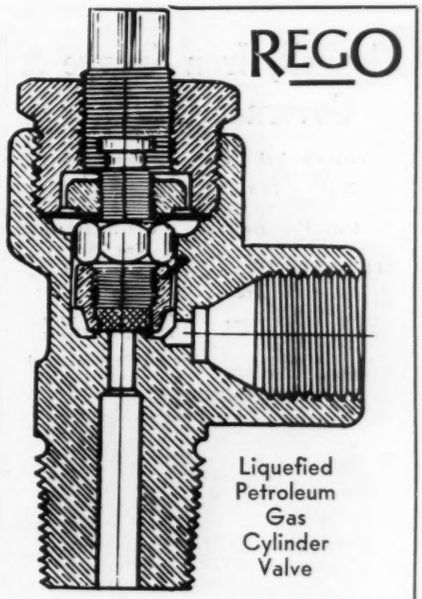
Other representatives in Washington remain the same, S. E. Crowther being in charge at Port Angeles, W. E. Meaney at Port Townsend and W. E. Wauge at Shelton.

Two Harbors Gas Dept. Names Operating Personnel

The City of Two Harbors Gas Department, Two Harbors, Minn., reports that Carl Barr has been named general manager and Carl P. Johnson is engineer of distribution for the department. The city recently established an air-butane plant, serving 530 B.t.u. gas under low pressure.

C. D. Reynolds Gets Natural or Butane Permit at Cameron

A franchise was granted to C. D. Reynolds and assigns on February 16 for the service of either butane or natural gas in Cameron, Mo. Mr. Reynolds states that he has not decided which type of system he will use, but that he expects to have 400 or 500 meters signed for to start operations.



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Here is the cylinder valve especially developed to hold the most volatile liquefied petroleum gas, under any working pressure and regardless of field conditions.

The RegO Cylinder Valve, engineered by the pioneers in Liquefied Petroleum Gas control equipment, is of the packingless diaphragm type . . . fool-proof, abuse-proof and free from faults. Hundreds of thousands of these valves are in constant daily use by practically all marketers of the wet or dry product.

If your present control equipment is not hundred per cent perfect in every respect, we shall be more than glad to have you put your problems up to us.

WE OFFER, FREE—

Every facility of this great organization is at your disposal . . . including all data on manufacture, distribution and sale of Liquefied Petroleum Gas. Write . . . ask us any questions!

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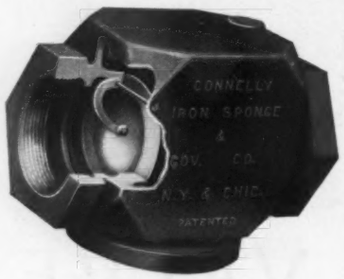
Counter-Balance Man Hole Cover
Safety-Syphon Seal



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THE BIGGS BOILER WORKS CO., Akron, Ohio

Display Car for Bottled Gas Sales in N. Y.

THE story of how one company carried the message of bottled gas to consumers throughout its territory is told in the above view of the W. H. Sweezy Heating Co., Inc., display car. The car is of the trailer type, equipped with a gas range serviced by Hopane. The company's bottled gas business is transacted chiefly with summer residents along the shores of Long Island, New York, the company maintaining headquarters at Riverhead. According to W. Sweezy Conklin, president of the company, the novelty of the equipment attracts a great deal of attention and is a practical and valuable means of merchandising.

Municipalities Gas Corp. Serves 22 Towns

MUNICIPALITIES Gas Corp., headquartered at Minneapolis, Minn., and operating out of Detroit Lakes with straight propane service, has recently announced the appointment of Sol Flegelman as president. Mr. Flegelman sends the accompanying review of the company's service extensions during the past year, as of January 30.

These franchises were obtained since the Spring of 1931, and the company is now serving in all of the towns except the last four on the list.

According to Mr. Flegelman the company is planning to conduct an extensive load-building campaign during the Spring months throughout the entire territory now served.

Town	*Franchise*	*Gas Service*	*Subsidiary*
Wahpeton, N. D.	Obtained	Now Operating	Wahpeton Gas Co.
Detroit Lakes, Minn.	Obtained	Now Operating	Detroit Lakes Gas Co.
Pelican Rapids, Minn.	Obtained	Now Operating	Detroit Lakes Gas Co.
Vergas, Minn.	Obtained	Now Operating	Detroit Lakes Gas Co.
Frazee, Minn.	Pending	Now Operating	Detroit Lakes Gas Co.
Barnesville, Minn.	Pending	Now Operating	Detroit Lakes Gas Co.
Park Rapids, Minn.	Obtained	Now Operating	Detroit Lakes Gas Co.
Calloway, Minn.	Obtained	Now Operating	Detroit Lakes Gas Co.
Perham, Minn.	Obtained	Now Operating	Detroit Lakes Gas Co.
Dent, Minn.	Obtained	Now Operating	Detroit Lakes Gas Co.
Lake Park, Minn.	Obtained	Now Operating	Detroit Lakes Gas Co.
Hawley, Minn.	Obtained	Now Operating	Detroit Lakes Gas Co.
Hitterdahl, Minn.	Obtained	Now Operating	Detroit Lakes Gas Co.
Wadena, Minn.	Obtained	Now Operating	Detroit Lakes Gas Co.
Ulen, Minn.	Obtained	Now Operating	Detroit Lakes Gas Co.
Staples, Minn.	Obtained	Now Operating	Detroit Lakes Gas Co.
Mahnomen, Minn.	Obtained	Now Operating	Detroit Lakes Gas Co.
New York Mills, Minn.	Obtained	Now Operating	Detroit Lakes Gas Co.
Sebeka, Minn.	Obtained	Now Operating	Detroit Lakes Gas Co.
Twin Valley, Minn.	Obtained	Now Operating	Detroit Lakes Gas Co.
Henning, Minn.	Obtained	Now Operating	Detroit Lakes Gas Co.
Battle Lake, Minn.	Obtained	Now Operating	Detroit Lakes Gas Co.
Ada, Minn.	Pending	Now Operating	Detroit Lakes Gas Co.
Bertha, Minn.	Obtained	Not Commenced	Detroit Lakes Gas Co.
Hewitt, Minn.	Obtained	Not Commenced	Detroit Lakes Gas Co.
Rothsay, Min.	Obtained	Not Commenced	Detroit Lakes Gas Co.
Menahga, Minn.	Obtained	Not Commenced	Detroit Lakes Gas Co.

Regional Meetings Being Held by Pyrofax Organization

The Pyrofax Division of the Carbide and Carbon Chemical Corporation is conducting, for the benefit of its distributor organization, a series of regional meetings, at which the sales and advertising program of the company are discussed.

A meeting was held in New York on February 24, another in Boston on the 26th, with others being scheduled for Columbus, Ohio; Detroit, Mich.; Minneapolis, Minn.; Chicago, Ill.; and Tampa, Fla., for the month of March.

Zion Natural Gas Co. Serving Bottled Gas in Utah Towns

The Zion Natural Gas Co., Cedar City, Utah, has recently been organized by J. W. Bucklen, and is operating out of Cedar City with service to St. George, Parowan, Modena, Beaver, Milford, Fillmore, Kanab, Orderville, Glendale, Circleville, Panguitch, Marysvale and Richfield. The company started serving these towns of southwestern Utah on November 15, 1931, with 83 per cent propane, 12 per cent butane and 3 per cent ethane in tanks, the tanks to be replaced in 1932 with mains in the towns large enough to warrant it. Propane and butane in proportions varying according to the temperature and season will be supplied without being mixed with air from centrally located storage tanks.

Appliances are being sold in the various towns by the gas company through the local hardware and furniture dealers.

The Zion Natural Gas Co. is independently owned by Mr. Bucklen, who was formerly general superintendent of the Inland Empire Gas Co., of El Centro, Calif. He was with Southern California Gas Co., Los Angeles, for the past three and one-half years, leaving to organize and manage the Cedar City utility.

Lowville Gas Co. Plant Completed in February

Lowville Gas Co., Lowville, New York, placed in operation during the latter part of February a butane-air plant, constructed to serve approximately 600 meters. The plant was built by Johnson & Church, Inc., of New York City, after Philgas Co. specifications. The Lowville Gas Co. is subsidiary to the National Gas & Utility Co. of New York.

May Establish Regulatory Body for Utilities in Tennessee

A bill to give a regulatory commission authority to regulate rates and service of gas, electric, water and telephone utilities in the state of Tennessee is now before the state legislature. The bill, known as Senate Bill No. 210, would place under the State Railroad Commission or a specially created Public Service Commission, the regulation of rates and services of all utilities.

Helium Discovery in Belle Fourche Area of South Dakota

According to a recent investigation made by the United States Geological Survey, gas with a helium content of 17⅞ per cent has been discovered near Belle Fourche, S. D., on the Camp Crook anticline. The test was made at the Midwest laboratories, Midwest, Wyo., by J. H. Voorhees, former professor of geology at the University of South Dakota, according to report.

Veeder Supply and Devel. Co. to Supply "Natural" to Oswego

The City of Oswego, Kansas, has signed a contract with the Veeder Supply and Development Co., Cherryvale, Kan., to supply natural gas to the municipal gas plant and distribution system to be constructed at Oswego. A $32,000 bond issue was recently voted for the purpose.

Extend Franchise Limit to October

The time limit on the franchise granted at Pilger, Neb., to the Northern Gas and Pipe Line Co., has been extended to October, 1932.

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A majority of distributors of Liquefied Petroleum Gas now use the Scaife cylinder.

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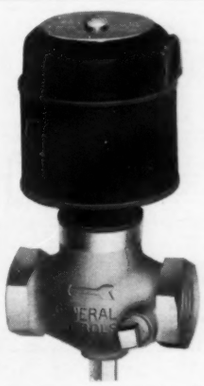
Oakmont, Pa. (Pittsburgh District)

New York Pittsburgh Chicago

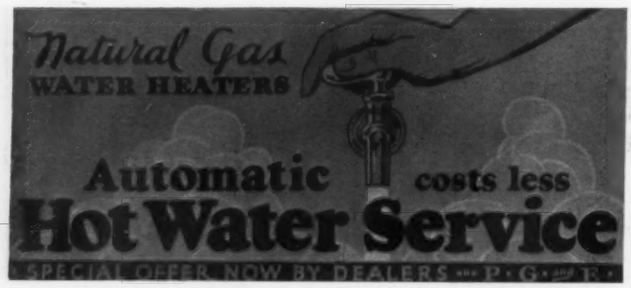


GENERAL CONTROLS
Magnetic Gas Valve

A noiseless A. C. Valve that closes on current failure and is priced below what you are paying.

GENERAL CONTROLS CO., Ltd.,
1539 Folsom Street, San Francisco
Jensen Instrument Company
Los Angeles Distributors

G C



AT LEFT: Fosters used during the campaign for adding water-heater load, to P. G. and E's. lines will broadcast the campaign symbol—a faucet with running hot water and the line "Automatic Hot Water Costs Less."

8,000 Water Heater Sales Goal for P. G. and E. Drive

J. Chas. Jordan

By J. CHARLES JORDAN

Assistant Manager
Publicity and Advertising
Pacific Gas and Electric Company

FOLLOWING the annual meeting of the Gas Appliance Society in San Francisco, Calif., attended by more than 500 members of the industry, there was launched on February 1, an extensive sales promotion and advertising campaign for the sale of automatic water heaters sponsored by the Pacific Gas and Electric Co. and participated in by dealers in the territory.

It is planned to sell 8,000 automatic water heaters in 120 days throughout northern California and create a minimum of $800,000 worth of automatic gas water heater business.

Taking an aggressive leadership in the stimulation of this class of business the company through its dealers' cooperation program started an advertising campaign on Monday, February 1. Space equivalent to 457 pages of 160 column inches each will be used in the newspapers. In other words there will be published by the utility during the campaign 16 advertisements in each of 47 daily newspapers, 16 advertisements in 12 weekly newspapers in towns where gas only is served and 8 advertisements in 124 weekly newspapers in cities and towns where gas and electricity are served. Altogether more than 1,938 newspaper advertisements will appear during the campaign.

Sales messages inviting prospects to visit the local stores or P. G. and E. offices will reach virtually every family in the campaign territory.

Supplementing this intensive newspaper drive there will be a half showing of poster boards in 64 cities and towns with 270 posters displayed. Copy will be changed twice during the four months campaign and like all the advertising copy released these panels will carry the united gas industry key symbol, a faucet with running hot water and the line, "Automatic Hot Water Costs Less".

Similar to the newspaper copy the boards will carry a line, "See the local dealers or P. G. and E."

Poster board designs will be reproduced on a card 18x55 inches and displayed on each side of 415 motor vehicles operated by the company, thus providing a floating circulation for the message.

The poster design in the form of a bill sticker will again be reproduced as a colored miniature 1½ inches by 3 inches, and more than one million of them will be attached to customers' gas bills.

To stimulate further interest among dealers, newspapers, employees and consumers, an intensive direct-by-mail program will be carried on. A broadside with complete details is being sent to all dealers and to the advertising managers of the several newspapers. Supplementing this will be monthly broadsides to dealers and newspapers, keeping them informed in advance of the size of the advertisements and the publication dates.

These broadsides will urge the dealers to run tie-in advertising beside the utility copy. The advertising men will aid the dealers in building up full and double pages of advertising. Broadsides will be mailed all employees, urging their cooperation through turning in the names of prospects, and the customers will receive broadsides stimulating further interest.

During the campaign 90 feature window displays will be used in 1-, 2-, and 3-piece set-ups. These displays will be routed through each of the offices operated by the company. They will be designed to coordinate with all other branches of the advertising and will carry the big faucet with running hot water and the keyline, "Automatic Hot Water Costs Less."

The copy above is typical of the 1,938 automatic water heater advertisements being run in daily and weekly newspapers over the P. G. and E. system.

20 Michigan Towns Added to Those Served With Gas

TWENTY communities were added during 1931 to the list of Michigan towns being served with gas, bringing the total to 283, as compared with 80, six years ago, according to recent report. The year's expansion operations necessitated construction of approximately 270 miles of high pressure lines. In the upper peninsula, the Michigan Gas and Electric Co. constructed a transmission line from Marquette to Negaunee and Ishpeming, supply coming from the new plant at Marquette, now in the final stages of completion. The plant at Ishpeming will be taken out of service.

Two high pressure natural gas lines were also constructed, one by Consumers Power Co., from the Broomfield township to Midland, 40 miles long; another, by the Gas Corp. of Michigan, connecting Mt. Pleasant, Clare and Rosebush with the Vernon township gas field. The gas plant at Mt. Pleasant was taken out of service.

Following is the list of new gas towns: Caro, Vassar, Reese, Richville, Bridgeport and Frankenmuth, Consumers Power Co., Zilwaukee plant.

Capac, Dryden, Atlas and Goodrich, Consumers Power Co., Flint plant.

Oshtemo, Lawton, Decatur, Paw Paw, Lawrence, Hartford and Bangor, Consumers Power Co., Kalamazoo plant.

Ovid, Michigan Federated Utilities, Owosso plant.

Coloma and Watervliet, Michigan Fuel and Light Co., Benton Harbor plant.

York township and new Ypsilanti State hospital, Washtenaw Gas Co., plant at Ann Arbor.

The Michigan Federated Utilities line from Owosso runs to St. Johns, which hereafter will be served from Owosso, the old St. Johns plant being abandoned. The line will be available to serve Shepardsville. The Vassar line of Consumers Power Co. will be available to serve Tuscola and the Caro line will be available to serve Wahjamega.

Waseca, Minn., Gives Permission to Interstate to Serve Natural

Waseca, Minn., has signified its permission for the Interstate Power Co. to serve natural gas there in place of the manufactured gas now being served. With the change over, a reduction of rates of about 25 per cent will go into effect. The rate for the first 5,000 cubic feet of manufactured was $2 per M., and under the new service it will be $1.50. Supply for the city will come from the lines of the Northern Gas and Pipe Line Co., Omaha, Neb. Austin, Minn., also served by Interstate Power Co., will hold an election on March 8 to settle the same question.

Albert Lea, Minn., will also have "natural" if the voters agree to Interstate's franchise proposal.

"We favor ELECTROLUX because it builds GREATER CUSTOMER GOOD-WILL for us"

This is the statement of* H. S. DOSSEL, *sales manager of the Tampa Gas Company, Tampa, Florida

MANY are the advantages to the Gas Company in handling Electrolux. But probably the one of most lasting value is this: Electrolux builds *customer good-will* because of the greater and more satisfactory service it renders.

Upon this hinges such profitable results as the addition of a virgin load to your present consumers' requirements; the frequent saving of the cooking load through the installation of Electrolux; the increased prestige which gas acquires as the modern fuel for domestic use.

Though more than 250,000 Electrolux refrigerators have been sold during the last four years, Electrolux is still the big new idea in automatic refrigeration. That's because it operates without machinery, without sound. And with no intermittent stopping and starting of the chilling process.

We've prepared just the material you'll need to start, follow up, and close valuable Electrolux sales in your territory. So write us today. Take advantage of the support you'll gain from the strongest and most intensive advertising campaign Electrolux has ever put on! Electrolux Refrigerator Sales, Inc., Evansville, Indiana.

A tiny gas flame takes the place of all moving parts

ELECTROLUX

THE *Gas* REFRIGERATOR

Promotional Room Rate Described

(Continued from Page 29)

average use per room is the rule but that uniform use may be expected in all classifications up to seven rooms and a fair degree of consistency in use per room for larger houses. Divergence from "normal" may be expected on one or two of the remaining classifications. Parenthetically, it might be stated that the relatively high use per room in three-room houses is probably due to the higher ratio of cooking use to total use in this classification and, further, to the poor class of construction which is characteristic.

This fact—uniform use per room—suggested so many ways of modifying the tentative rate above which would eliminate the unfair feature and yet be promotional that it deserved verification. With this in mind the customers use and the revenue therefrom was investigated by months and classified by rooms per house. It was subsequently verified in two other widely separated towns which later showed much more uniform use per room than the town for which this rate was developed. These are given for reference in Table No. 3.

A summary of experience in the town in question with the old rate gave the data shown in Table No. 4.

The fact of "uniform use per room" seemed pretty well demonstrated by the above data. It is true that the data shown represent annual summaries; however, the detailed analysis also demonstrated the fact that uniform use per room ran consistently throughout the year by months. This experience is identical with that of electric utilities and is the basis of the Wright form of rate which has been so widely and so successfully used as a promotional rate in the electric utilities. After some analysis, the following rate—of the Wright form—was selected:

DOMESTIC SERVICE

Contract Rate—Combination Flat and Meter

Flat rate of 30c per room per month with no residence being billed on less than four or more than eight rooms, and a

Meter Rate of first 10 hundred cubic feet per room per month—6c per hundred cubic feet.

Next 10 hundred cubic feet per room per month—3c per hundred cubic feet.

Excess—2c per hundred cubic feet.

Net Minimum Monthly Bill. The flat rate portion of the above stated rate.

From the rate form above it may be observed that this provides for room counts only from four-room houses to eight rooms, inclusive. It may be observed from Table No. 4 that there is very little to be gained in classifying the houses more extensively than this, and it certainly tends to simplify an already complicated rate.

Applying this rate to the accounts of our customers non-optionally we obtained the reduction noted in Table No. 5. This, however, does not disclose the fact that a rather large percentage of specific consumers' annual accounts were actually raised. The increases were all in the accounts of marginal consumers but were fairly equally distributed over all classes as follows: 4 rooms, 17; 5 rooms, 54; 6 rooms, 46; 7 rooms, 18; 8 rooms or more, 10; total, 145.

The number of customers increased represented 29.72 per cent of the total number of customers but only a small per cent of total billing. It was also evident in the analysis that the rate could not be applied with fairness to both company and customer except for year-round use; however, both of these defects could be eliminated by making the rate optional and by limiting it to those customers who would subscribe to year-round service. By eliminating from Table No. 5 all customers for whom this rate meant an increase and all customers who had received service for less than eight consecutive months (this would give the maximum possible reduction in company's gross) we obtained results as shown in Table No. 6.

Obviously, the per cent reduction in Table No. 6 does not give any indication of the effect of the new rate on the monthly billing, and it also is obvious that the monthly bills in the summer will be higher with the new rate than with the old. The effect of this is shown in Table No. 7.

TABLE NO. 5. COMPARISON OF OLD AND NEW RATE (NON-OPTIONAL)

No. of Rooms Per House	Gross Revenue Present Rate	Gross Revenue Proposed Rate	Reduction Dollars	Reduction %
4 or less	5,015.75	4,262.90	752.85	15.00
5	10,013.00	8,945.00	1,068.00	10.66
6	6,730.25	6,077.80	652.45	9.69
7	1,979.00	2,001.30	22.30*	1.06*
8 or more	3,636.10	3,128.30	507.80	13.96
Total			2,958.80	10.70

* Increase.

TABLE NO. 6. MAXIMUM ANNUAL REDUCTION IN REVENUE FROM NEW RATE

No. of Rooms	Rev. Old Rate	Rev. New Rate	Reduction Dollars	Reduction %
4 rooms or less	5,024.00	4,396.60	627.40	12.50
5 rooms	10,021.25	8,955.75	1,065.50	10.64
6 rooms	6,740.75	6,017.90	722.85	10.74
7 rooms	1,981.25	1,884.35	96.90	4.89
8 rooms or more	3,641.75	3,031.05	610.70	16.79
Total	27,409.00	24,285.65	3,123.35	11.39

TABLE NO. 7

No. of Rooms	Avg. Max. Summer Monthly Increase	Avg. Max. Summer Mo. % Increase	Avg. Max. Winter Monthly Reduction	Avg. Max. Winter % Reduction
4 rooms or less	$ .23	9.87	$ 2.93	36.17
5 rooms	.41	17.67	3.75	36.23
6 rooms	.78	28.99	5.60	40.02
7 rooms	1.11	42.05	4.56	33.21
8 rooms or over	2.14	32.18	19.05	45.47

New Rate's Advantages

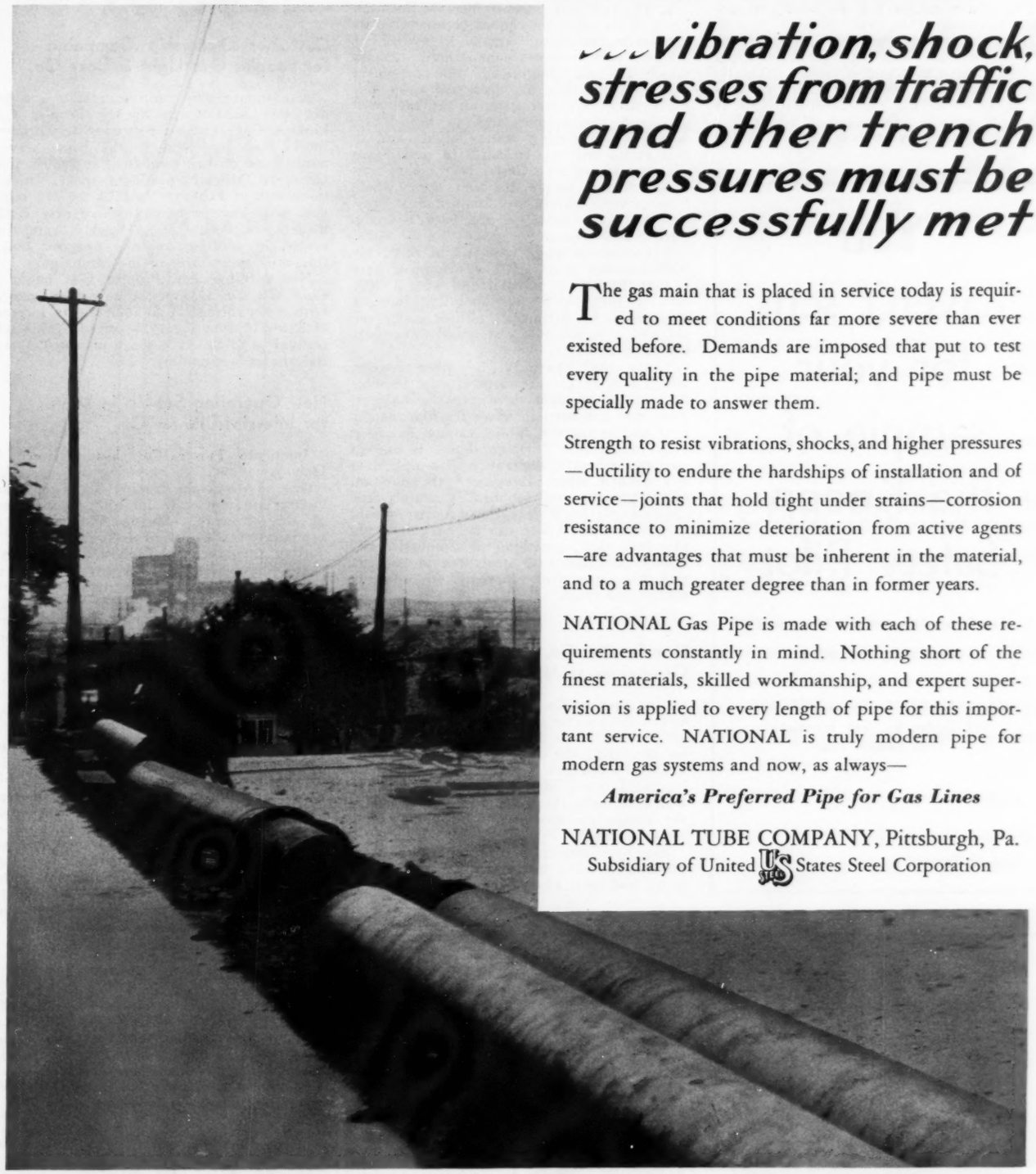
Such, in essence, is the working of the new rate. It would seem that this rate has the following advantages:

1. The proposed form of rate balances bills more equally for a 12-month period, thus eliminating, to a large extent, the present cause of complaint, i.e., relatively high winter bills. Under the old rate the ratio of the average maximum winter monthly bill to the average minimum summer monthly bill was approximately 5 to 1. Under the new rate this ratio becomes approximately 2½ to 1. The gas utility's income from this source would become rather definitely fixed, irrespective of unseasonal temperature variations and the company could advise the individual almost exactly what his monthly bill would be for any given month.

2. The rate form permits the customer to use gas unsparingly in cold weather, since he is not penalized thereby with the relatively high rates embodied in the old form of rate.

3. The proposed rate form is promotional; therefore, it can be voluntarily instituted with the frank statement that the purpose of the rate form is to sell more gas and thereby secure more revenue but in so doing the company is passing on some of the "saving" to the customer. In this instance if all of the customers elected the new rate, we would lose in revenue $3123.35, but by making all customers year-round customers, we would off-set the loss by increased revenue of $2692, leaving only $431 to be recovered by increased sales. Our revenues, as a conse-

MODERN GAS SYSTEMS NEED MODERN PIPE—



...vibration, shock, stresses from traffic and other trench pressures must be successfully met

The gas main that is placed in service today is required to meet conditions far more severe than ever existed before. Demands are imposed that put to test every quality in the pipe material; and pipe must be specially made to answer them.

Strength to resist vibrations, shocks, and higher pressures —ductility to endure the hardships of installation and of service—joints that hold tight under strains—corrosion resistance to minimize deterioration from active agents —are advantages that must be inherent in the material, and to a much greater degree than in former years.

NATIONAL Gas Pipe is made with each of these requirements constantly in mind. Nothing short of the finest materials, skilled workmanship, and expert supervision is applied to every length of pipe for this important service. NATIONAL is truly modern pipe for modern gas systems and now, as always—

America's Preferred Pipe for Gas Lines

NATIONAL TUBE COMPANY, Pittsburgh, Pa.
Subsidiary of United States Steel Corporation

NATIONAL PIPE

quence, will suffer only temporarily and our public relations will certainly be enhanced.

4. Demagogues will find a criticism of the rate difficult because criticism must involve some knowledge of the rate and its working. Even where this knowledge is present, any effort to attempt to distort facts for the purpose of arousing public criticism must involve too much technical discussion and thereby lose its effect in public debate.

The disadvantages for the most part are more imaginary than real.

1. The proposed rate does not apply to all customers and does not offer a reduction for all of those to whom it applies. This is true and can be answered by stating the corollary, i.e., that the rate form attempts to distribute equally upon all customers a fair portion of the investment cost, operating cost and maintenance cost and that the average customer forms the basis of this rate development.

2. It may be said that the rate is too complicated and consequently too hard to "sell." Fortunately, this most serious criticism can be answered quite effectively with the statement that it has been widely sold with exceptionally good results by several of the major electrical utilities.

3. The rate may possibly increase the peak load. This objection cannot be answered so positively but must remain a matter of opinion until there are some definite data on which to base judgment. The argument may be used that the decreased price per thousand in the last steps of the rate will encourage many consumers to keep their houses warm during winter nights and to that extent will off-set increased peak loads of other customers. Certainly the rate will induce many people to keep their whole house warm, whereas we know that at present many are living in the back bedroom during cold weather.

4. Consumers might complain of relatively high summer months. The argument here is that the rate is optional and with a little care on the part of our operating force, a comparison of consumers' billing under the old and new schedule can readily overcome the complaint.

There may, perhaps, be other reasons which will make this form of rate impracticable, but to date these are not evident. This rate has been in effect for two months now and so far the public reaction has been very favorable. This, no doubt, is due in part to the hearty cooperation of a high class city council which recognized the question of rates as a mutual problem. Certainly, any conclusions from our experience to date would be premature. There can be no gainsaying the fact that something is fundamentally wrong with gas rate structures in general, and this experiment represents our effort to correct the fault.

You haven't sent for your sample of the Knopp Safety Pilot

(See P. 61, Feb. Issue Western Gas)

SEND THIS COUPON

GAS & ELECTRIC FACILITIES, LTD.
447 Sutter St., San Francisco
Send Sample Pilot

Name.....
Address.....
City.....State.....
Type of Burner.....

Gas Service Co. Plans Sales Campaigns at Jan. 27 Meeting

Gas Service Co. new business executives met at the general office in Kansas City, Mo., on January 27 to discuss methods and plans for increasing the company's business during 1932. Campaigns for the year, plans for increased sales activities and means by which to help the employment situation in the company's territory, were among subjects discussed.

Employee cooperation in the sale of appliances is being stressed in the year's program, and local advertising and window displays will be used to build up merchandising totals. An intensive range selling campaign is being planned for all district offices and subsidiary companies having a new business department.

During the month of February a special discount was offered for installation of househeating burners and the New Business Department has plans for many other featured activities and campaigns during the spring months.

Customer Ownership Campaign for Peoples Gas Light & Coke Co.

A customer ownership campaign got under way in Chicago by the Peoples Gas Light & Coke Co., on February 1, with two special meetings held in the home service auditorium of the company, at which time George F. Mitchell, president, spoke. During the month of February each of the 700 salesmen will have a quota of five new stockholders to secure. A weekly campaign poster, in addition to daily progress bulletins, will be features of the campaign.

Net earnings for Peoples Gas Light & Coke Co. for 1931 set a new high record, with a net income of $7,562,582—an increase of $364,510 over the 1930 period. This was equivalent to $10.95 a share on 690,000 capital shares outstanding.

New Operating Set-Up in Minn. for Interstate Power Co.

Interstate Power Co., headquartered in Dubuque, Iowa, is changing its operating set-up in Minnesota, making Rochester headquarters in that state for all gas operations of the company. Spring Valley will be headquarters for electrical operations. S. N. Jordan, manager at Rochester for several years, has been transferred to Decorah, Iowa, where he will be manager of the Northern Iowa District of the company, replacing M. E. Hall, who is reported scheduled to take the managership of the company at Albert Lea, Minn.

American Gas Construction Co. Asks Little Falls Franchise

Little Falls, Minn., is investigating the proposal of the American Gas Construction Co., Minneapolis, to serve that town with gas. According to report, the complete plant and distribution system would cost about $100,000. C. E. Tenney is said to be representing the company in the transaction, and it is reported that the American Gas Construction Co. has formed an affiliation with a natural gas company interested in bringing a gas transmission line from eastern Montana.

Hutchinson Gas Co. Moves to New Headquarters

The Hutchinson Gas Co., Hutchinson, Kan., a Gas Service subsidiary, has moved into a new location at 106-108 West First Street. The new quarters have been remodeled and redecorated, with a 50 foot by 40 foot sales floor.

Lintner and Lee of So. Union Gas Co. Exchange Positions

J. O. Lintner, manager of the Southern Union Gas Co. at Bellville, Texas, has taken the position of manager for the Eagle Lake, Texas, office of the company. A. E. Lee, manager for the company at Eagle Lake, Texas, is now manager at Bellville, Texas.

NEMEC
BURNERS
FOR ALL REQUIREMENTS
NEMEC combustion ENGINEERS
WHITTIER – CALIFORNIA.

A Best Seller in Any Season

The Roper 28-D for short order houses and small restaurants, has never been seasonal merchandise. Used as a single oven section or as part of a battery of two or more units, it fits into the kitchen plan whenever remodeling or expansion is under way.

As an all-around range for small restaurants and short order houses, and an off-peak range for big hotel kitchens, it is without a rival. Here is a range that actually sells itself.

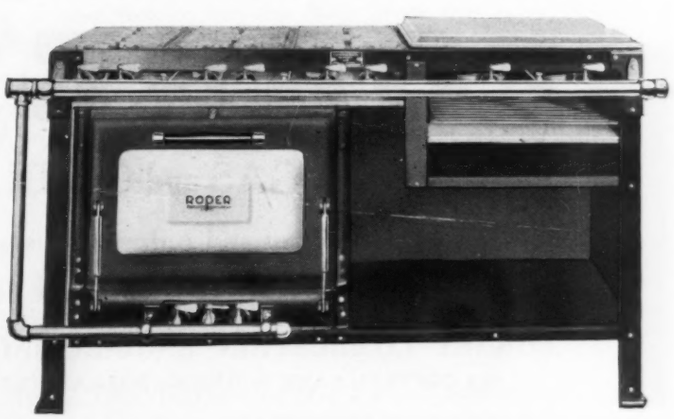
George D. Roper Corp., Rockford, Ill.

C. B. Babcock Co., 135 Bluxome St., San Francisco
Pacific Coast Branch

ROPER

TRADE MARK
REG. U.S. PAT. OFF. REG. IN CANADA

GAS RANGES



SOUTH CHESTER STEEL PIPE

Excels for Gas Service

The unusual care given to accuracy of diameter and welding qualities, makes Chester Pipe a favorite for gas lines.

SOUTH CHESTER TUBE CO.
Chester, Pa.

VITEX
GAS VENT AND FLUE PIPE
Light – Durable
Insulating
Non-corrosive

PLANT RUBBER and ASBESTOS WORKS
537 Brannan Street · San Francisco
PR-102

GROBLE REGULATORS & GOVERNORS
Complete Line of Regulators for
Natural, Manufactured, Butane and Propane Gas
Pacific Coast Representative,
T. G. ARROWSMITH COMPANY,
661 Howard Street San Francisco, Calif.
Phone Garfield 8419
GROBLE GAS REGULATOR COMPANY
Office and Factory: Anderson, Indiana

FORNEY
COMBINATION GAS and OIL BURNERS
For Power Plant and Industrial Uses
Write for Literature
and List of Installations
FORNEY COMBUSTION ENGINEERING CO.
513 CENTRAL BANK BUILDING, DALLAS, TEXAS

Preston W. Lupher Dies at His Columbus, Ohio, Home

Preston W. Lupher, connected with the gas industry since 1877, died at his home in Columbus, Ohio, on January 17. Mr. Lupher, following activities in the fields of Pennsylvania, went to Ohio in 1897, where he took an option on the Logan Natural Gas & Fuel Co. in partnership with T. N. Barnsdall. This partnership brought about the supplying of natural gas through a network of transmission lines to about 75 cities and towns in Ohio.

Mr. Lupher went to Columbus, Ohio, in 1902, when the company's general office was moved there, and continued as vice-president and general manager of the Logan company until 1924, when he became president. He retired from active direction in 1925, and formed a partnership with his son, Morton S. Lupher, in the development of gas and oil properties in several of the eastern states.

Republic Steel Corp. Announces Brochure on Pipe Casing

Republic Steel Corp., Youngstown, Ohio, has brought from the press an unusually attractive brochure on the company's line of line pipe casing. The booklet is printed in three colors—silver, red and black, with 36 pages of information describing the work which goes into the processes of making Republic electric weld line pipe and casing. In addition, tables showing weight, diameter, thickness and mill test standards as well as information on threads and couplings are given. A table of safe working pressures and various safety factors is also contained. All requests for copies of the brochure should be sent to the above address on business letterheads.

Independent Engineering Co. to Build Line to Wellington, Texas

Wellington and Memphis, Texas, have signed a contract with Roy Purdue of Pampa, Texas, representing the Independent Engineering Co., Inc., for a supply of gas for municipal gas distribution systems which are to be constructed in both towns. An 8-inch line will be constructed from Gray and Carson counties, Texas, to Wellington and Memphis, a distance of approximately 50 miles. The consumption is estimated at about 1,000,000,000 cubic feet per year.

C. H. Collins Named K. C. Representative for Chaplin Fulton

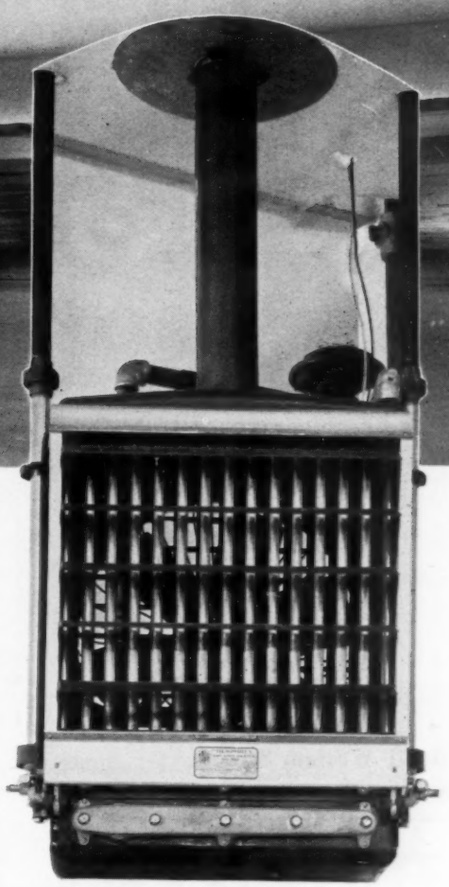
C. H. Collins has been appointed representative for Chaplin-Fulton Manufacturing Co. of Pittsburgh, manufacturer of gas regulators. Mr. Collins will look after the complete line of C-F regulators within his territory, and offices are located at 628 Dwight Building, Kansas City, Mo.

Twenty-five Oklahoma Towns Sign for Natural in 1931

Records of the Oklahoma Utilities Association show that natural gas franchises were granted or contracts signed during 1931 by 25 towns in Oklahoma. Several of these were served by new distribution systems during 1931, and others expect service some time during the coming months.

Gates Now on Sales Force of Pacific Gas and Electric Co.

Ray Gates, formerly with the Union Oil Co. in Oakland, has joined the sales force of the San Francisco Division of the Pacific Gas and Electric Co., where he will work on domestic gas appliance sales.



"Impossible" Jobs are Easy with the Humphrey Unit Heater

Transforming an unheated market building, 260 ft. wide by 200 ft. long and with 20 ft. ceilings, into a comfortably heated auditorium to house the Portland Automobile Show was the problem that confronted engineers of the Portland Gas & Coke Co. in February. They turned to the Humphrey gas-fired Unit Heater as a solution.

Sixteen No. 100 Units were installed, each one with switch control at the unit. When the building was turned over to the Portland Association of Automobile Dealers for their big annual display of automobiles, airplanes and motor boats, the large expanse was as comfortable as a living room.

The heater used in the Portland installation,—the No. 100, with 10,000 B.t.u. input rating. There is a No. 60,-60,000 B.t.u. and a No. 200,-200,000 B.t.u., for various sized jobs.

Tests conducted showed the battery of unit heaters was accomplishing a complete circulation of heat from one end of the hall to the other in less than 4 minutes time.

Every new heating problem is becoming a new victory for the Humphrey Gas Unit Heater. Warehouses, lofts, factories, offices, theatres and churches are but a few of the many classifications that are Humphrey Unit heated. Self-contained, independent and compact, the heaters release valuable floor and wall space for productive use, and they eliminate expensive boiler equipment, steam lines and labor expense incidental to old style central heating. "Impossible" jobs are easy with the Humphrey.

General Gas Light Company
Kalamazoo, Michigan

C. B. Babcock, Pacific Coast Mgr., 135 Bluxome St., San Francisco

For All Types of Gases Use

LAVA

At the Point of Combustion

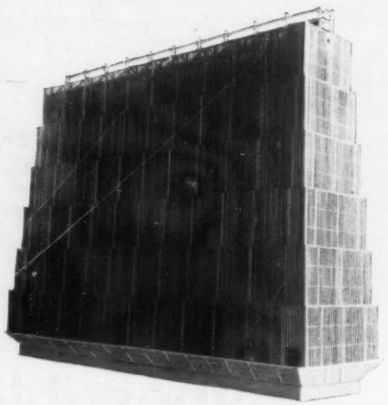
Have You Our Gas Booklet 31?

AMERICAN LAVA CORPORATION

1431 William Street CHATTANOOGA, TENN.

New Cooling Tower by Fluor Corp., Ltd., Los Angeles

A new design of cooling tower has been developed for manufacture recently by the Fluor Corp., Ltd., Los Angeles. The physical appearance of this tower is a decided departure from the usual style employed, having a taper construction widening from top to bottom. A feature of the new structure is the vertical aerator panels which replace



the louvers found in previous models. It is stated that these panels reduce the possibility of water escaping from the tower to a minimum, even in case of extremely high winds.

The tower is constructed with practically the same framework as that of previous Fluor towers. In addition to this, the new taper construction adds a factor of stability.

HOFFMAN

In thirty-three years of intensive engineering development The Hoffman Automatic Gas Water Heater has reached the utmost peak of economical consumer satisfaction.

Write for Profitable Detailed Information.

The Hoffman Heater Co.

1701 Dixie Highway
Louisville, Kentucky

MUELLER
GAS ERA
BOILERS

fill the most exacting demands for thoroughly dependable and economical gas-fired steam and hot water heating equipment.

For details, write:

L. J. MUELLER FURNACE CO.,
334 S. 2nd St., Milwaukee, Wis.

Makers of a complete line of gas-fired boilers and pressed steel and cast furnaces

C. E. Knox Leases Municipal Gas System at Covington, Okla.

The town of Covington, Okla., has leased its municipally owned gas distribution system for a period of 3 years to C. E. Knox, who has a supply near the city and who for the past two years has been furnishing the city with gas. Under his former contract Mr. Knox furnished gas at 35 cents per M.c.f., but did not do any of the collecting of bills or repairing of the lines. The city was suffering a loss under this arrangement from uncollected bills. Under his new contract Mr. Knox takes over the collection of bills and the maintenance of gas lines, supplying gas service at 45 cents per M.c.f.

Complete 125 Miles of Telephone Line from Clifton to Lincoln

Northern Gas and Pipe Line Co., Omaha, has completed and placed in operation the first unit of its private telephone system which will eventually parallel the entire main line of the company. The completed section extends 125 miles from Clifton, Kan., to Lincoln, Neb., connecting the compressor station at Clifton to division headquarters at Lincoln.

Southern California Gas Co. to Spend $2,000,000 in 1932

Southern California Gas Co., Los Angeles, plans to spend about $2,000,000 in extension of service area and improvements to existing systems in 1932.

2 newest additions

TO OUR SENSATIONAL 1932 LINE

Detroit Jewel • Garland, *Table Top*

1 Our pledge to "give the people what they want at a price they can afford to pay" has produced a sensational combination of quality and prices in our 1932 line. The Table Top Model features are cooking top 43 x 21, flush grates . . . half the top is a work table, and pans and kettles can be *slid* on to the grates without lifting . . . colored porcelain burner cover converts whole top into a large kitchen table . . . oven and broiler full family size . . . insulated door on oven and broiler . . . controls never become hot . . . sparkling porcelain inside and out . . . finished in beautiful ivory and green marbleized effect, and priced to fit 1932 pocketbooks.

2 The Super De Luxe has the largest cooking top of any console type range on the market—27 x 20—ample space for all utensils used in large family meals. Folding porcelain cover top makes an auxiliary table . . . Therminsul insulation in oven and broiler . . . self-contained drawer type broiler upon roller bearings . . . extra large utility drawer upon roller bearings . . . enamel finish burners and grates . . . high-low top burner valves . . . Robertshaw oven control . . . Insta-flame automatic lighter. Never before have such quality and features been offered at our price. Write for the complete catalog and list of trade discounts.

Detroit Jewel • Garland, *Super De Luxe*

DETROIT-MICHIGAN STOVE COMPANY · DETROIT, MICHIGAN

READERS of WESTERN GAS

MAKE USE OF OUR OFFICES as headquarters during your visit to the Olympic Games.

YOUR MAIL may be forwarded in our care.

USE OUR FREE stenographic and telephone service.

HOTEL RESERVATIONS and sight seeing trips planned for you.

MEET YOUR friends here.

124 West 4th Street
Los Angeles

Stop at San Francisco on your trip to or from the Olympic Games. The same facilities are offered you at the San Francisco office of WESTERN GAS—447 Sutter Street—San Francisco

WE'LL BE GLAD TO SEE YOU.

Service Reports on Line Inspection

—and that's where the story is told.

Report of Dearborn Representative I. L. Yetman, Oklahoma City office: (December 9, 1931.)

"Inspected six-inch line coated with NO-OX-ID in 1927, both pipe and material look good. Also inspected eight-inch line coated with some black material same year. This will have to be reconditioned this Spring. Have hopes of getting this job."

Report of Dearborn Representative E. M. Welch, Pittsburgh office:

"Mr. B—— has been here three years and has examined NO-OX-ID coated pipe laid before his time and finds coating as good as when laid. Has a stream crossing coated with NO-OX-ID one year ago that he is watching. It is still as good as new."

Write for recommendations and estimates.

DEARBORN CHEMICAL COMPANY
LOS ANGELES:
807 Mateo Street Phone TRinity 3385
SAN FRANCISCO:
421 Bryant Street Phone DAvenport 658

NO-OX-ID
IRON-RUST
The Original Rust Preventive

We Can Deliver to West and Southwest Equally as Low in Price as in Middlewest

LUX PURIFYING MATERIAL

MOST ECONOMICAL BECAUSE
MOST EFFICIENT
ALSO LASTS LONGER
QUICK DELIVERY

THE ALPHA-LUX CO., Inc.

192 Front St., New York City. Branches: Philadelphia, Chicago. Storage Base: New Orleans

GENERAL CERAMICS COMPANY

71 West 35 Street, New York, N. Y.

REFRACTORIES FOR GAS APPLIANCES

Genceraco Refractories are made in all shapes and sizes, in color, decorated or plain and in any quantity. They may be had in dense as well as porous material. Extremely resistant to thermal shock and are physically strong. We will gladly send you a quotation on your requirements.

Burns & McDonnell Engineering Co. Report to City of Rochester

According to a preliminary report given by Burns & McDonnell Engineering Co., employed by the City of Rochester, Minn., to figure the cost of establishing a municipal gas distribution system, the city could obtain such a system by the expenditure of $302,164. The report contained an appraisal of the gas manufacturing plant and distribution system owned by the Interstate Power Co. in Rochester. If the municipal system is established, the city plans to distribute natural gas, according to report. The lines of the Northern Gas and Pipe Line Co. are now serving the Mayo Clinic and the Franklin Institute in Rochester.

The rate schedule for municipal service of natural gas is given as follows:

First 300 cubic feet or less per month, 75 cents.

Next 1,700 cubic feet or less a month, $1.50 for 1,000 cubic feet.

Next 2,000 cubic feet or less a month, $1.30 for 1,000 cubic feet.

Next 2,000 cubic feet or less a month, 80 cents for 1,000 cubic feet.

Next 44,000 cubic feet or less a month, 60 cents for 1,000 cubic feet.

Next 50,000 cubic feet or less a month, 55 cents for 1,000 cubic feet.

Semet-Solvay Describes New Gas Producer in Bulletin No. 45

Semet-Solvay Engineering Corp., New York, announces that it has just brought from the press Bulletin No. 45, on the Semet-Solvay Koller Type Gas Producer. The bulletin contains data on the producer under the following chapter headings: Generator, Fuel Feed, Fuel Magazine, Koller Grate, Tuyere Design, Steam Drum, Saturator, Pressure Regulation, Gas Quality, Gas Cleaning, Dust Removal, Tar Removal, Operation of Type F Tar Extractor, Fuels for Making Producer Gas and How Producer Gas is Made. Copies may be obtained by addressing the company at 40 Rector Street, New York.

Taylor Forge & Pipe Works Publishes Bulletin No. 32-1

The Taylor Forge & Pipe Works, Chicago, Ill., announces publication of a new 4-page pamphlet styled Bulletin 32-1, which gives dimensional and list price data on the Taylor Forge seamless steel fittings for welding and Taylor forge flanges.

The company also manufactures a line of forged steel boiler nozzles, pipe flanges, corrugated boiler furnace, spiral riveted pressure pipe, forge welded pipe, cement lined pipe and forged and rolled steel rings.

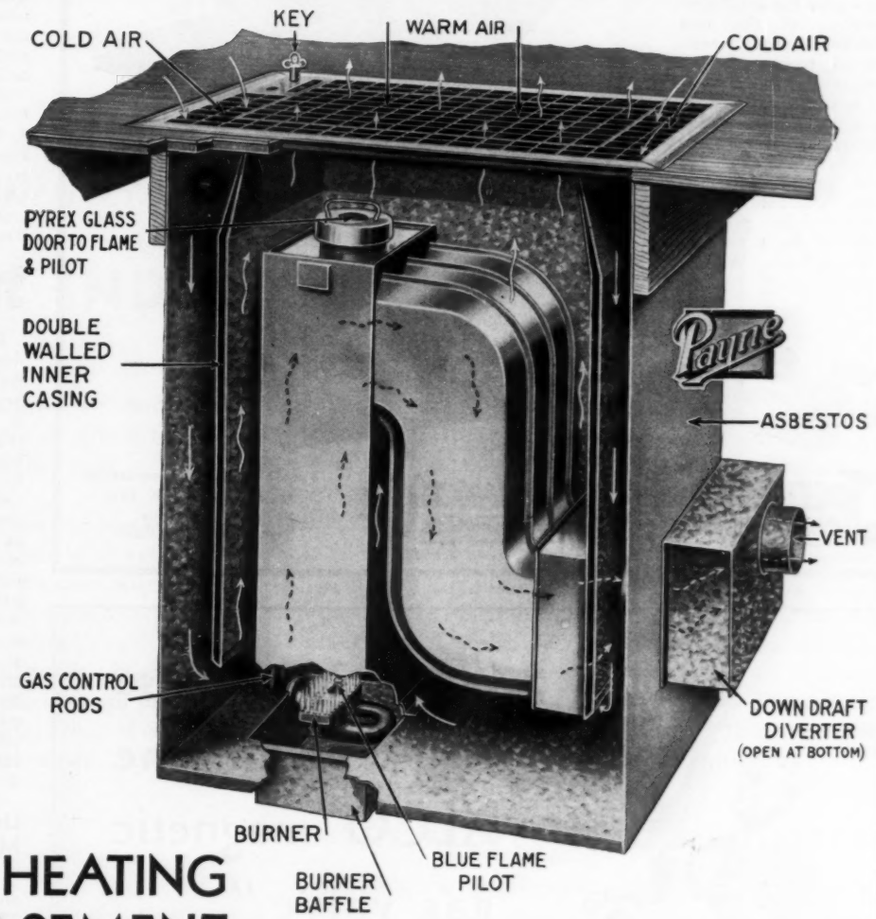
To Construct Natural Gas Line to Pittsfield, Ill.

Panhandle Illinois Pipe Line Co., subsidiary of Panhandle Eastern Pipe Line Co., Kansas City, Mo., is reported planning construction of a natural gas extension from its main line to serve Pittsfield, Ill., with gas. When the line is completed it will be operated by the Central Illinois Public Service Co., Springfield, Ill.

Southern Calif. Gas Co. May Extend Service to Orosi District

The Dinuba office of the Southern California Gas Co. of Los Angeles is securing signatures of residents and property owners in the Orosi district desiring gas service and if a sufficient number of prospective consumers sign, service will be extended into the district in the near future.

PAYNE
FLOOR FURNACES



Winter's Substitute for Summer's HEAT!

THE PAYNE FLOOR Furnace uses gas—the cleanest, most dependable and most efficient of all fuels. Gives ideal summer heat indoors. Endorsed by thousands of users everywhere!

NO MORE COLD FLOORS • • No Sweating of Windows

THE PAYNE Floor Furnace circulates fresh pure warm air in every nook and corner, keeps floors warm! Free from smoke, fumes and vapors!

WARM AIR HEATING Without a BASEMENT

PAYNE FLOOR FURNACES have been tested and proved in the crucible of time. Durably constructed. Easy to install and operate. Completely welded heating element. Heating efficiency, burner operation, safety, construction and performance have been approved by the American Gas Association—and by thousands of happy and enthusiastic users.

Every PAYNE FLOOR FURNACE installation is a friend-maker and a sure "repeater". No forced selling to put this item over. A sales success for sixteen years.

Write Today for Details of Dealer Franchise!

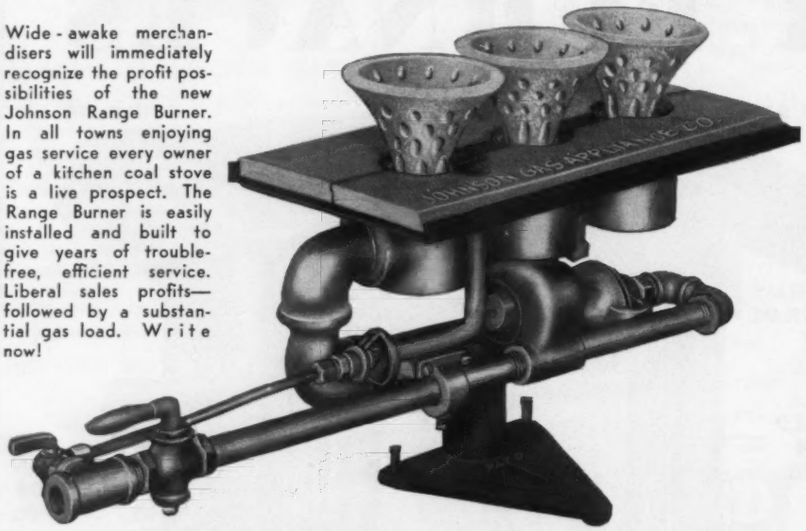
Payne

PAYNE FURNACE & SUPPLY CO. Beverly Hills, California

THERE IS A PAYNE HEAT SYSTEM FOR EVERY BUILDING AND CLIMATE!

Thousands of Prospects for the Johnson Range Burner

Wide-awake merchandisers will immediately recognize the profit possibilities of the new Johnson Range Burner. In all towns enjoying gas service every owner of a kitchen coal stove is a live prospect. The Range Burner is easily installed and built to give years of trouble-free, efficient service. Liberal sales profits—followed by a substantial gas load. Write now!



JOHNSON GAS APPLIANCE CO.
Cedar Rapids IOWA

Pacific Coast Representative
C. B. BABCOCK CO.
135 Bluxome St.
San Francisco, Calif.

"Consider these features of the ALCO magnetic gas valve."

Quiet—Inexpensive—Will not leak—Packless—Power consumption only 12 watts—Furnished for high or low voltage A. C. or D. C.—Sizes 1½"-1½" inclusive.

These are the features that make the Type SG Valve an ideal control for domestic gas burners using either natural or manufactured gas. Used in connection with any standard thermostat, this valve provides a very satisfactory though inexpensive control.

The Type SG Valve can be furnished with an emergency hand operation feature and a pilot light fitting if desired.

Detailed information is contained in our Bulletin No. 112 sent upon request.

ALCO VALVE COMPANY, INC.

ALCO

MAIN OFFICE AND FACTORY: 2641 BIG BEND BOULEVARD,
MAPLEWOOD BRANCH, P. O. ST. LOUIS, U. S. A.
New York, Philadelphia
Represented by Pacific Scientific Company
Los Angeles, San Francisco

New Members for Board of Directors of Canadian Utility

Appointment of three new members of the board of directors of the Dominion Gas and Electric Co. has been announced—H. W. Briggs, Herbert L. Nichols, Ralph P. Buell and E. A. Harden. These appointments follow the resignation of three officials of the American Commonwealths Power Corp. from the Dominion board—Frank T. Hulswit, president of American Commonwealths Power; David A. Belden, vice-president, and Albert Vermeer, secretary for the company. American Commonwealths Power Corp. and its subsidiary, American Community Power Co., are in receivership, but the Dominion Gas and Electric Co. is not directly affected by the action.

Dominion Gas and Electric Co. controls the Canadian Western Natural Gas, Light, Heat & Power Co., Ltd., of Calgary, Alberta, the Edmonton Utilities, Edmonton, and the Northwestern Utilities, Ltd., of Edmonton. These companies serve gas and electricity to many communities in Alberta, British Columbia and Saskatchewan.

Plans Proceeding for Re-Financing of Western Service Corp.

Logan W. Cary, Oklahoma City, president, Consolidated Gas Service Co., who was recently named receiver of the Western Service Corp. of Oklahoma City, by Edgar S. Vaught, judge of the United States District Court, is having an audit made of the books and records of the company, preparatory to proposing a plan for refinancing. Chicago bankers have recently been in conference with Earl R. Ernsberger, president of the Western Service Corp., and with the receiver with a view to securing new finances for the concern. The corporation has natural gas properties and franchises in Kansas and Missouri, and also operates a gas distribution system in Guthrie, Okla. The company also secured a franchise at Shawnee, Okla., and installed part of a new distribution system before going into the hands of a receiver, but the Oklahoma Natural Gas Corp., which has served that city for several years, still has charge of the distribution service there.

Lindeweld Process Shown in Motion Pictures of Line Construction

The technique of the Lindenweld Process and its application in the construction of a 20-inch natural gas line are shown in full detail in a two-reel motion picture, "New Lindeweld Process for Pipe Line Construction," prepared and distributed by The Linde Air Products Co., 30 East 42nd Street, New York, N .Y.

This new film is available for showing before engineering and technical societies. engineering colleges, trade and vocational schools, foremen's clubs, and other technical and industrial groups, being loaned free of charge. Inquiries may be addressed to the nearest district office of The Linde Air Products Co.

Andrew J. Stacey, Executive of Stacey Organizations, Dies

Andrew J. Stacey, 73 years old, vice-president and director of the Stacey Bros. Gas Construction Co. and director of the Stacey Manufacturing Co., subsidiaries of the International-Stacey Corp., died January 18 at his home, 1120 Wyoming Avenue, Wyoming, Ohio, a suburb of Cincinnati.

Mr. Stacey was vice-president of the firm founded by his father and had been with the Stacey companies since his youth.

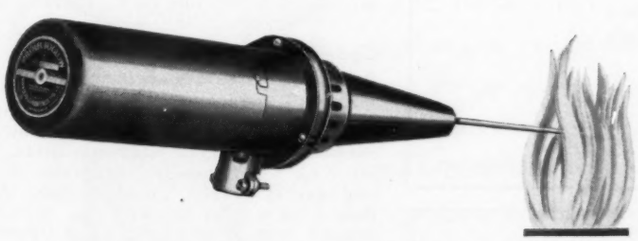
LET *Automatically Controlled* Gas sell your **INDUSTRIAL** prospect

YOUR industrial prospect knows, or thinks he knows, the advantages of gas as a fuel for his heating processes. But does he realize how *automatic controls* amplify these advantages?

Unless you have clearly pointed out to him the accuracy, precision and economy possible with automatically controlled gas in industrial process work, you have but partly told your story. You have overlooked the major part of your selling argument.

Minneapolis-Honeywell automatically controlled gas insures the greatest possible efficiency in preventing spoilage due to incorrect temperatures and in economy through eliminating fuel waste. Automatic controls are your most effective allies. Let them sell your industrial prospect. Minneapolis-Honeywell Regulator Co., Executive offices, 401 East 28th Street, Minneapolis, Minn. Factories: Minneapolis, Minn., Elkhart and Wabash, Indiana.

California Branch: 557 Market St., San Francisco. Distributors: Arthur F. Erickson Co., 315 Selling Bldg., Portland, Ore.; Arthur F. Erickson Co., 816 Terminal Trades Bldg., Seattle, Wash.; English & Lauer, 1224 So. San Pedro St., Los Angeles, Cal.; Daly Co., 1635 Blake St., Denver, Colo.; Hawley-Richardson-Williams Co., 204 Dooley Bldg., Salt Lake City, Utah. Other branch offices or distributors in all principal cities.



THE PROTECT-O-GLOW

Simple and dependable, this new device guards against unburned gas by INSTANTLY *shutting off flow if flame or pilot fails by breaking electric current and closing valve.*

THE PROTECT-O-GLOW SYSTEM

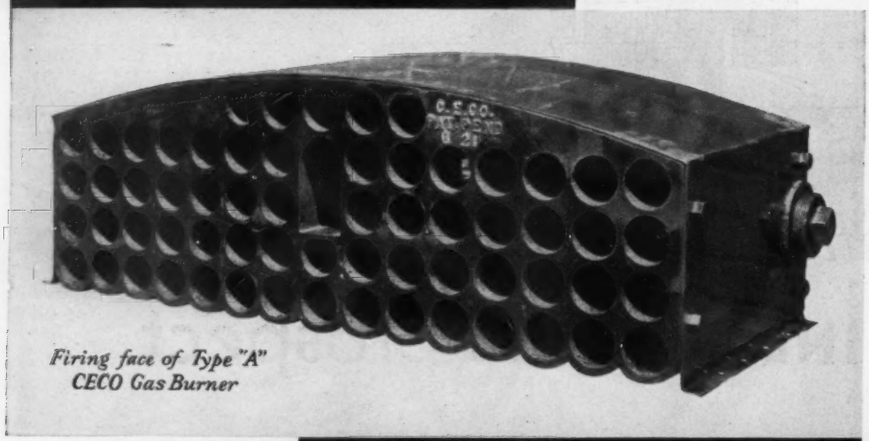
The New Minneapolis-Honeywell Protect-O-Glow *instantly* shuts off gas flow in case of flame or pilot failure, thus affording positive protection against the escape of unburned gas. Entirely electrical, and without moving parts, it is not dependent upon temperature and is absolutely reliable. The Protect-O-Glow is universal in application. The same instrument may be used for all installations, either independently or in conjunction with any desired type of control system.

Call the Minneapolis-Honeywell sales engineer today and let him explain the Protect-O-Glow and the many other control systems that will help you sell gas to your industrial prospects.

MINNEAPOLIS-HONEYWELL *and* **TIME-O-STAT**
Control Systems

MORE HEAT FOR LESS MONEY

A BULLETIN FULL OF MONEY-SAVING FACTS IS YOURS FOR THE ASKING



Firing face of Type "A" CECO Gas Burner

COMBUSTION EQUIPMENT COMPANY
KANSAS CITY, MO.
WICHITA MEMPHIS HOUSTON

CECO
POWER PLANT TYPE
(A & E SERIES)
MULTIPLE JET GAS BURNERS

BITGOOD
Multiple Jet Gas Burners
Industrial Furnaces
SAN JOAQUIN BURNERS
Prat Daniel Thermix Stacks and Air Heaters
Bigelow-Liptak Suspended Arches and Walls
North American Burners and Blowers
F. S. BITGOOD, Inc.
Furnace and Combustion Engineers
Los Angeles Portland San Francisco

Gentlemen:
Kindly send me a sample can and full details regarding A-B Vit
The New Porcelain Enamel Cleaner
Name.....
Company.....
Address.....
No obligation, of course
Clip and Mail with 10c to cover postage and packing to
A-B STOVE CO., Battle Creek, Mich.

R. L. Sparks to Have Charge of N. Y. Office for Alco Valve

The Alco Valve Co. of St. Louis, Mo., announces the opening of an eastern sales office and service shop at 251 West 30th Street, New York City. R. L. Sparks, vice-president of the company, is in charge. A complete stock of valves and parts will be available there to expedite delivery of material in the eastern territory.

William G. Smith, formerly with the Southern Engineering Co. of Memphis, Tenn., has recently become associated with the Alco Valve Co. and will handle the sale of Alco products in the southern states. He will cover eastern Texas, Oklahoma, Arkansas, Louisiana, Mississippi, Alabama, Tennessee, and western Georgia.

J. H. Fitzpatrick, with headquarters in Cleveland, Ohio, is now covering the Buffalo, Pittsburgh, Cleveland and Detroit district. The territory of A. B. Schellenberg has been extended to include Indiana, Illinois, Wisconsin, Minnesota, Iowa, eastern Nebraska and Missouri. The Pacific Scientific Co., with offices in San Francisco and Los Angeles, will continue to represent the Alco Valve Co. on the west coast.

General Gas Sales Co. Organized By King and Marshall

Noble H. King and Marshall McGrath have recently formed the General Gas Sales Co., with offices at 111 Balboa St., San Francisco. It is the company's plan to distribute domestic, commercial and industrial gas heating equipment.

Mr. King was for 10 years salesman and district sales manager for the Southern Counties Gas Co., and Mr. McGrath has been in the heating business in San Francisco a number of years under the name of the Empire Heating Co.

Bring in 15,000,000 c. f. Gasser in Dudley Ridge Area

The Irma Investment Co., operating in the Dudley Ridge area of Kettleman Hills, California, brought in a 15,000,000 cubic foot gasser. This is the second large gasser to be brought in by the Irma company, making four producing gas wells for the territory, three already being tied in with the Pacific Gas and Electric Co.'s lines. The Irma No. 2 is expected to be tied into the P. G. and E. lines.

Cedar Creek Oil & Gas Co. Asks Austin Natural Franchise

Thos. A. Jirik of Faribault, Minn., president of the Cedar Creek Oil and Gas Co., operating in eastern Montana fields, has asked for a franchise for the service of natural gas in Austin, Minn. Supply would come from a large diameter line to be constructed from Montana fields, via Ortonville to the Twin Cities.

Gas Consumption at Council Bluffs Gains With "Natural"

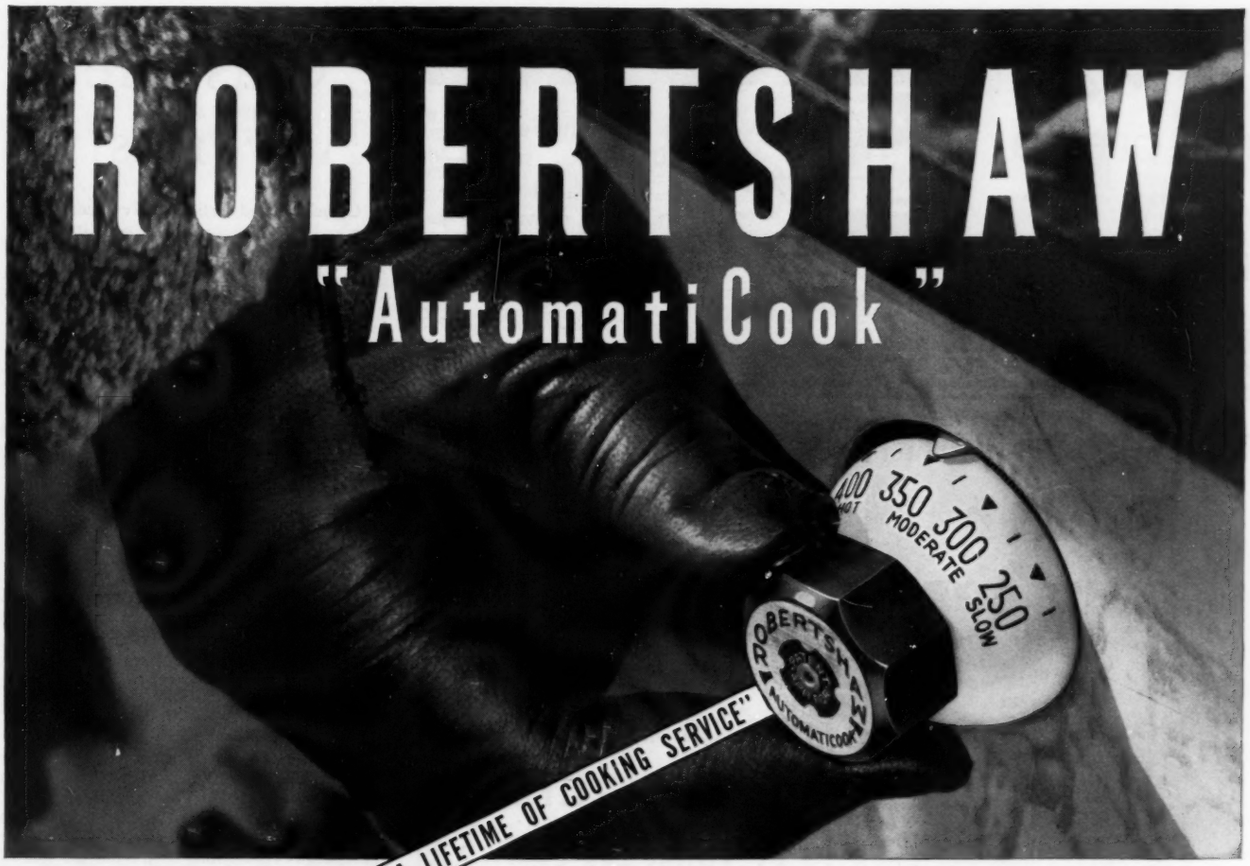
During the year that Council Bluffs, Iowa, has been on natural gas service, the daily consumption has increased from 750,000 cubic feet to 2,250,000. The increase is attributed chiefly to industrial and house-heating installations.

Hoffman Votes Franchise to Andy McInturff, Okmulgee

Citizens of Hoffman, Okla., have voted a gas franchise to Andy McInturff of Okmulgee, Okla.

ROBERTSHAW

"AutomatiCook"



NEW MODEL "F" FOR TABLE TOP AND CONSOLE RANGES

MODEL "K" FOR CONSOLE RANGES

This New Robertshaw means

EXTRA SALES FOR YOU

● The Robertshaw contribution to the gas range industry has been an exceptional combination of engineering skill and aggressive merchandising.

● As soon as the new table top ranges appeared, Robertshaw designed a new AutomatiCook to meet their special requirements.

● And it is a real AutomatiCook in every way, fully comparable to the long known Model "K". Note its handy, yet inconspicuous location. It's as easy to set as a radio dial.

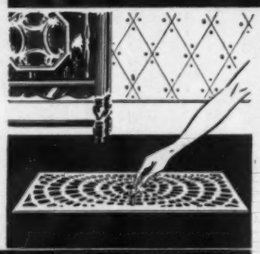
● Both the new Model "F" and the famous Model "K" render the last word in precise, accurate, trouble-free oven control. Complete details of this new Robertshaw, for either table top or console ranges, should be on your desk today. Write for them now.

ROBERTSHAW THERMOSTAT CO.

YOUNGWOOD · · PA.

Electrogas

HAS OPENED A NEW FIELD



The new model 51—51,000 B.t.u. rated—has solved the problem of completely heating the average home.

"It's Matchless"

ELECTROGAS FURNACE CO.
466 SUTTER STREET • SAN FRANCISCO

Classified Advertising

Classified advertising five cents per word; minimum $2.00 per insertion. Situation Wanted advertisements up to 50 words will be published three consecutive issues without charge. Small professional cards 1-in. deep by 21 ems wide are $5.00 monthly on 12-time contract.

Fraser Furnaces

Floor Furnaces
Wall Furnaces
Console Heaters

A complete line of Quality Equipment

20 different models all A.G.A. approved

Write for prices and additional information

Manufactured by

Fraser Furnace Company

Stockton, Calif.

Distributed by

H. R. BASFORD CO. San Francisco Los Angeles

SUBSTANTIAL REDUCTION ON VENTED CLOW GASTEAM RADIATORS

WRITE for NEW PRICES

JAMES B. CLOW & SONS
201-299 N. Talman Avenue, Chicago

The Semet-Solvay Engineering Corporation invites your inquiries for

Equipment for the manufacture, cleaning and handling of gas.
Equipment for the recovery and treatment of coal by-products.
Welded steel products, piping and valves.
Producer gas and blue gas apparatus.
Engineering service, investigations and reports.

Semet-Solvay Engineering Corporation

40 Rector St. New York, N. Y.

WANTED—HEATERS

Cash for Gas Heaters. One of the country's largest retail outlets is willing to buy close-outs of gas heaters. Prices must be low enough to warrant carrying over to 1933 season. Send pictures, prices, and shipping weights. Address Box B-110, *Western Gas*, 124 West Fourth Street, Los Angeles, Calif.

SITUATIONS WANTED—MALE

Mechanical engineer and draftsman experienced in laying out, drawing plans, and writing construction specifications for gas compressor stations and natural gas absorption plants, also in supervision of construction, desires position with company needing qualified man. Applicant's age, 29 years. References and record of experience supplied. Employment duration and location immaterial. Address Box E-173, *Western Gas*, 124 West Fourth Street, Los Angeles, Calif.

Natural gas engineer, 34 years of age, married, seeks position. Applicant has had 12 years experience in new business, public relations, furnace conversions, valuation and main line and distribution system construction. With the exception of 2 years this experience has been in the Mid-Continent field in new gas territory. Address E-Box 175, *Western Gas*, 124 West Fourth St., Los Angeles, Calif.

Construction and field engineer desires position, location immaterial. Applicant has had seven years experience on pipe line construction, layouts, mapping, surveying, and as building superintendent, and also two years experience on butane systems. References furnished. Address Box E-177, *Western Gas*, 124 West Fourth Street, Los Angeles, Calif.

Executive, experienced in all phases of public utility operation and management, especially electric and natural gas, desires position. Applicant is capable of assuming responsibility for operation of a property, and has been particularly successful with public relations and merchandising. Will locate anywhere. Available immediately. Unquestionable references furnished. Address Box E-179, *Western Gas*, 124 West Fourth Street, Los Angeles, Calif.

Heating engineer, age 38, with 23 years experience in the natural gas industry, desires position with active company. Applicant is

ADD COMFORT IN THE HOME
RECORDS FILED WITH RECORDER
We Are Marin County Dealers for
HUMPHREY GAS WATER HEATERS
and the
MARS GAS FURNACE
H. C. LITTLE BURNER CO.
215 A St. Ph. 1664 San Rafael
AUTOMATIC HOT WATER COSTS LESS
Once a user of a—
PITTSBURG AUTOMATIC STORAGE GAS WATER HEATER WITH A SAFETY PILOT
always a user as well as a booster
OUR 25 YEARS OF INSTALLATION EXPERIENCE
GEO. A. SHIELDS CO.
HOT WATER HEATING, A SAFEGUARD TO HEALTH
Dealers Listed Upon This Page Handle Appliances Approved by the American Gas Association
Goodbye Teakettles, Water-backs & Tank Heaters!
Lower prices on AUTOMATIC Gas Water Heaters
Cost 50% LESS than in 1917... Cost 40% LESS to OPERATE
thanks to Natural Gas
Automatic GAS Water Heats Costs Less
PACIFIC GAS AND ELECTRIC COMPANY
P·G·and E·
Dependable hot water for every purpose with the
LAWSON AUTOMATIC WATER HEATER
Economy in Operation
Lawson products known around the world
A. J. DAGGETT
PLUMBING AND HEATING
Mother steps in— and steps out
M. J. PRICE HARDWARE
FAIRFAX, CALIFORNIA
RUUD AND PITTSBURG
AUTOMATIC GAS
WATER HEATERS
Gas Circulators
Gas Water Heaters
Gas Furnaces
Plumbing and Sheet Metal Work
M. M. KING
Genuine HUMPHREY Automatic Hot Water Service Now within reach of all!
IS YOUR HOME Truly Modern?
MODERNIZE YOUR HOME
A. L. NELSON & CO.
HOT WATER at the turn of the faucet
PITTSBURG AUTOMATIC WATER HEATERS
A. W. CAPELLI
We announce the agency for Marin Co. of the
Andrews Circulating Wall Heaters
Good heat with good health. Satisfied users for reference.
GEO. A. SHIELDS CO.
20-Year-Old Girl Held as Member of Gang That Kidnaped Banker
Aerial History Made as Chinese Pilot Downs Japanese Bomber
MARKET PRICES DRIFT LOWER
NOVATO HAPPENINGS
DAY AND NIGHT Automatic GAS Water Heaters
WALSH
Buy gas equipment approved by the American Gas Association
PACIFIC WATER HEATER
THE HEATER WITH THE 5-YEAR GUARANTEE
DEPENDABLE - ECONOMICAL DAY AND NIGHT SERVICE
FALCO GAS FURNACES
Economical to Operate
Easy to Install
Terms to Suit Your Pocket Book
PACIFIC HEATING CO.
25 Mariposa Street
Phone 3361-J San Anselmo
Gas, Coal, Wood and Oil Furnaces
Sheet Metal and Patent Chimney Work
GAS Water Heaters, Ranges, Circulating Heaters, Wall Heaters.
G. W. QUIN
PITTSBURG CRANE PREMIER CRANE KEYSTONE RUUD
DAY & NIGHT Automatic Gas Water Heaters
R. Kinsella Co.
Plumbing, Heating and Sheet Metal
Phone S. R. 1138
816 B St. San Rafael

AGAIN, *Dealers Tie In For* INCREASED SALES

Goal: $800,000 Worth of Water Heater Business

The above reproduction of a newspaper double spread, shows the effective manner in which dealers are capitalizing on the United Industry Campaign to sell 8,000 Automatic Gas Water Heaters in four months.

In support of this extensive campaign, Pacific Gas and Electric Company is designing each of its water heater advertisements to include a complete selling message and to encourage prospects to visit their dealers' stores. Advertisements are being published in every newspaper within P. G. and E. territory of gas service.

Thus, dealers throughout Northern and Central California are enabled to tie in with, and capitalize on, this powerful advertising campaign.

You know that more than 75 per cent of the homes in this territory still use obsolete methods of heating water. Automatic Hot Water Service not only costs less, but today's Automatic Gas Water Heaters cost 50 per cent less than in 1917. Leading manufacturers and distributers are offering, through their dealers, the easiest terms in history. These factors, plus the feature of Automatic Gas Water Heaters as a necessity, offer dealers an opportunity to *INCREASE* water heater *SALES* with tie-in advertising.

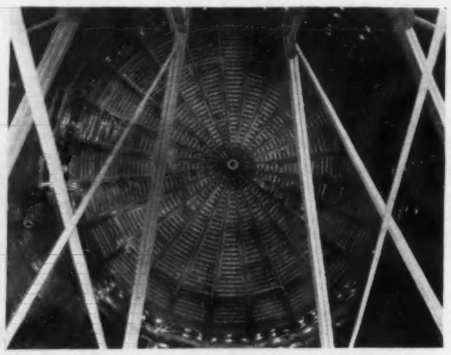
Use tie-in advertising to direct prospects to your store. Reap your share of this $800,000 market as others are doing.

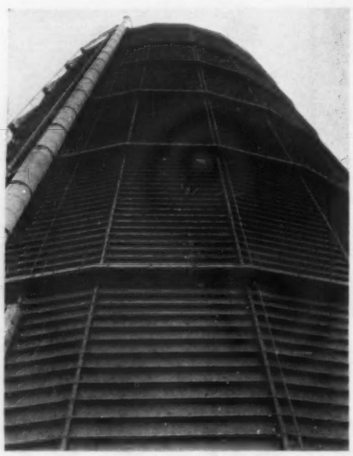
PACIFIC GAS AND ELECTRIC COMPANY

P·G·and E·

Owned·Operated·Managed
by Californians

WG-203-332





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IMPROVED APPEARANCE
LOWER MAINTENANCE
UNIFORM PRESSURE
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OF THE
MANY ADVANTAGES OF THE
M. A. N.

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BALTIMORE — MARYLAND

Subsidiary Company, THE WESTERN GAS CONSTRUCTION CO., Ft. Wayne, Ind.

Coal Gas, Carburetted Water Gas, Blue Water Gas, By-Product Plants—De-Brouwer Charging and Discharging Machines—Waste Heat Boilers—Purifiers—Tar Extractors—Condensers—Feld Scrubbers—Fast's Couplings—Tanks—Gas Holders

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PILOT LIGHT
CHANGEABLE ORIFICE ANY KIND OF GAS
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BUNSEN TUBE MIXER
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ELECTRIC TERMINALS
GAS SUPPLY

THIS NEW, SIMPLE, COMPACT SWITCH
MAKES OR BREAKS CIRCUIT WITHIN
30 SECONDS

Satisfaction Guaranteed

SENT ON 10 DAYS' TRIAL. FOR TEST WE WILL PAY TRANSPORTATION BOTH WAYS.

110 volt
4 Amp.

Mettler Entrained Combustion Gas Burners
FOR ALL Purposes Kinds of gas Pressures
BUILT UNDER PATENTS: JANUARY 25th, 1916 JANUARY 2nd, 1923 MAY 26th, 1925 NOV 4th, 1926
LEE B. METTLER CO.
406 S. Main St. Los Angeles, Cal.

Price Delivered $4.50

capable of managing series of small town properties. Has had experience as manager, sales manager, and chief heating engineer with large companies. Address Box E-181, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

Woman secretary desires position. 12 years experience in public utility commercial department and gas appliance wholesale organization. Complete knowledge of secretarial duties and office management. Address Box E-183, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

Executive type of man, now employed, with large personal acquaintance with leading utilities and dealers of the West, desires to make change. Experience includes conducting of sales classes, cooking schools and merchandise sales. Can furnish highest type business, personal and financial references. Address Box E-185, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

Single man, age 27, experienced in house heating and industrial conversion work, also operation and maintenance of high and low pressure systems, wants position. Past four years with the Gas Service Co., Kansas City, Mo. Desires to make connection with another company; will go any place; can furnish good references. Address Box E-187, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

Young man, 25 years of age, with more than three years experience in house heating with natural gas, desires position. Applicant has had college education, and is familiar with installation and adjustment of all types of conversion burners, gas fired boilers and furnaces. Is capable of estimating heating requirements and can handle design of installations. Some experience with industrial boiler conversion of 100 h.p. and less. Address Box E-189, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

General manager of natural gas distributing company, having exceptional experience in building industrial load in new territory, desires to make change. Graduate engineer and previous knowledge of manufactured gas operations and several years of selling gas plant equipment. Address Box E-191, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

Engineering graduate, experienced in design, testing and construction of butane gas plants and general engineering practice, desires position. Address Box E-193, *Western Gas,* 124 West Fourth St., Los Angeles, Calif.

Gas measurement engineer and accountant seeks position. Broad experience in both office and field with orifice meters, computation of charts, and accounting records for gas and natural gasoline. Familiar with charcoal testing, gasoline distillation, and other laboratory work connected with absorption plants and gas measurement. Age 31. Will go anywhere. Address Box E-195, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

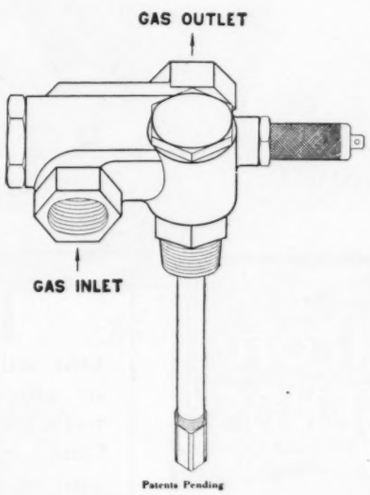
Announcing!

A Further Development

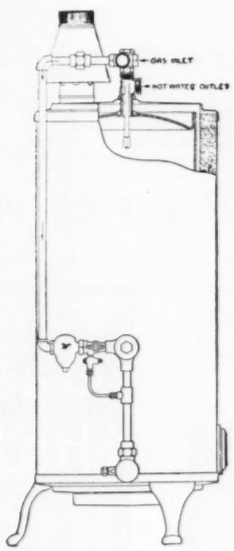
By Welsbach Laboratories

The Welsbach Hi-Temperature Gas Cutoff

An Emergency Gas Shutoff, closing off gas supply if temperature of water in tank reaches 206° to 212°, requiring neither tools nor parts to be manually reset.



The Welsbach Hi-Temperature Gas Cut-off



Welsbach Hi-Temperature Gas Cut-off connected to tank and gas line. Note method of installation on Welsbach water heater.

Available on

HOTZONE Welsbach STAZHOT

Welsbach Self-Action Storage Gas Water Heaters

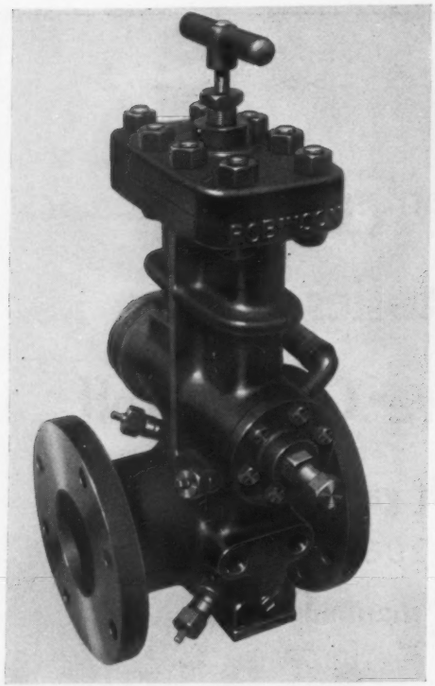
Write or Wire

50 Hawthorne Street
San Francisco

Welsbach COMPANY
Gloucester City, N. J.

For details or demonstration

226 So. Wabash Ave.
Chicago



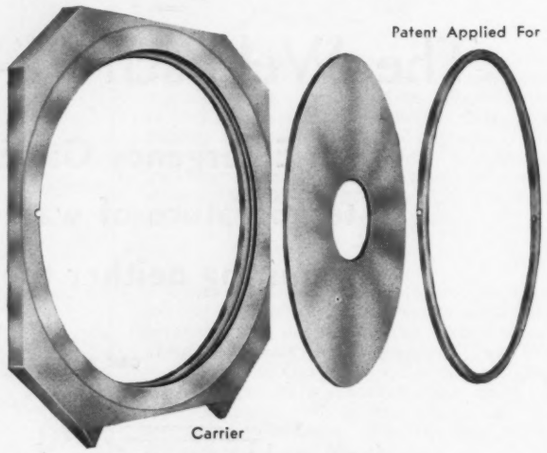
ENGINEERED TO SAVE YOU MONEY

Robinson Orifice Fittings are designed to save money for the user by providing accuracy and economy in metering gas through pipe lines. Nearly 14,000 in service have proven their efficiency.

Now—another money-saving product is presented by Robinson engineers—the Rofco Orifice Plate. This assures great savings in original cost and in transportation and storage of orifice plates.

Rofco Orifice Plates Assure Great Savings

So designed that original orifice plate can be renewed indefinitely by buying low-cost orifice disc inserts. If you are now using original orifice plates, send them to us to be machined to use the inserts.



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1435 Santa Fe Ave. Los Angeles, Calif.

DISTRIBUTORS: The Foxboro Co., Foxboro, Mass., Chicago, Dallas, Houston, Los Angeles, Pittsburgh, Tulsa—Westcott & Greis, Inc., Dallas, Houston, Los Angeles, Tulsa—England: Walker, Crosweller & Co., 54-58 Queen Elizabeth St., London, S. E. No. 1—Canada: Peacock Bros., Ltd., Montreal, Calgary, Winnipeg.

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. . . ROFCO ORIFICE PLATES

For smart living . . . this exclusive apartment hotel in the heart of the famous Wilshire District, overlooking beautiful Westlake and Lafayette Parks.

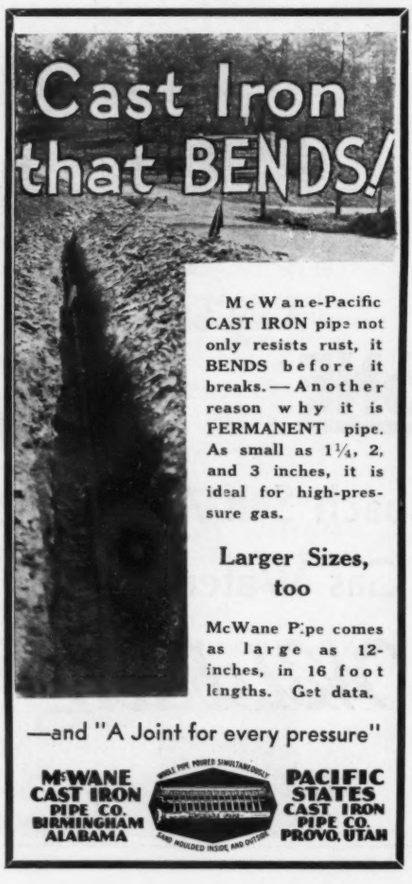
Rates on Application

L. C. Reed, Manager

The Arcady

2619 WILSHIRE BLVD.

LOS ANGELES



McWane-Pacific CAST IRON pipe not only resists rust, it BENDS before it breaks.—Another reason why it is PERMANENT pipe. As small as 1¼, 2, and 3 inches, it is ideal for high-pressure gas.

Larger Sizes, too

McWane Pipe comes as large as 12-inches, in 16 foot lengths. Get data.

—and "A Joint for every pressure"

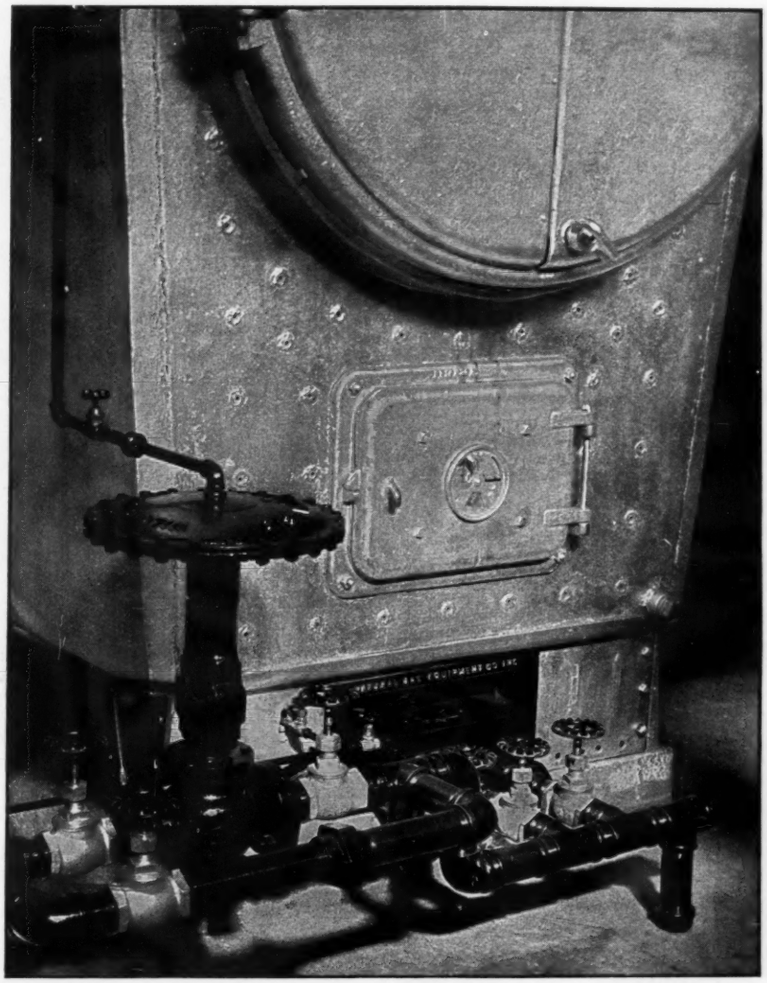
McWANE CAST IRON PIPE CO. BIRMINGHAM ALABAMA

PACIFIC STATES CAST IRON PIPE CO. PROVO, UTAH

To develop and attain still higher standards of efficiency in our products and processes, this Company has recently built and equipped one of the finest foundry research laboratories in the world. Under the direction of a Research Engineer of widely recognized attainments, a competent staff is constantly at work to the end that U. S. Cast Iron Pipe shall be good pipe—as good as it is humanly and mechanically possible to produce.

U. S. Cast Iron Pipe

United States Pipe and Foundry Co., Burlington, N. J. Sales Offices: New York, Buffalo, Cleveland, Chicago, Philadelphia, Pittsburgh, Dallas, Birmingham, Kansas City, Minneapolis, Seattle, Los Angeles, San Francisco



N. G. E. Type W Burners and Wilgus-N. G. E. Gas Fuel Regulator with Automatic Louvre Control, installed in the 50 h. p. boiler of the Theodore Roosevelt High School, Glendale, Cal.

This hook-up will help you sell more conversion jobs!

THE boys tell us there's conversion business to be signed up, if only enough convenience and economy over other fuels can be shown.

The job pictured is a good example of both. Turn just one radiator off, and you can hear the regulator throttle the gas supply, and automatically cut down the air intake through the louvres.

It's a slick gadget. We've been working on it for months. But your customers don't have to do anything about it but point with pride to their Orsat readings.

N. G. E. Type W and HW burners take full advantage of *radiation*, which transmits heat in proportion to the difference of the fourth powers of the absolute temperatures, as well as of convection and conduction, in which the rate of transmission is in proportion to the first power of the temperature differential. Large surfaces heated to incandescence direct radiant heat against the water legs of the boiler, getting all the steam possible out of the amount of gas consumed.

Confidentially . . . mail the coupon, and we'll send you data sheets giving 24 more points to help you sell these burners . . . and some figures double-checked with our shiny new gas analysis apparatus that'll knock your eye out!

Pioneer Products

Wilgus-N. G. E. Gas Fuel and Pressure Regulators • N. G. E. Liquid Level Controllers • N. G. E. Gas Burners • Webster Radiant Gas Burners • Surface Combustion Industrial Furnaces • Janitrol House Heat Machines.

NATURAL GAS EQUIPMENT INC.
714 West 10th Street, Los Angeles.

Please send those data sheets on Type W burners with your compliments.

NAME_____

COMPANY_____

ADDRESS_____

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LOS ANGELES . . . . . PETROLEUM SECURITIES BUILDING
SAN FRANCISCO . . . . . 1123 HARRISON STREET
BUTTE, MONTANA . . . . . HEATING ASSURANCE INC.

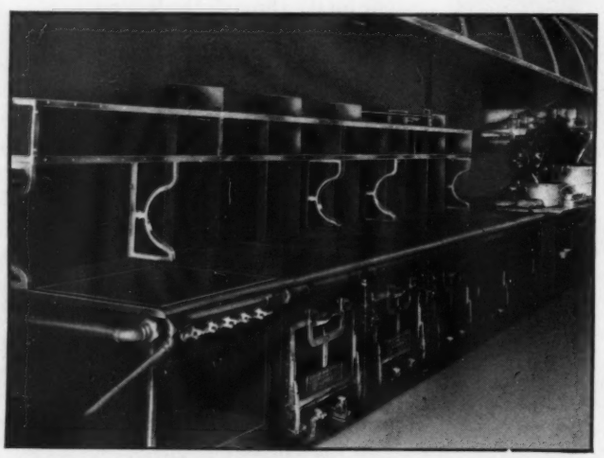
Western Distributors for SURFACE COMBUSTION COMPANY • WEBSTER ENGINEERING COMPANY

And Now in San Francisco Leighton's Goes 100% MADSEN

FAR-FAMED for their success are the Leighton Industries.

When 1931 closed, 20 of the Leighton kitchens were Madsen equipped. Now Leighton's has gone 100% Madsen in the Bay District, and 24 Leighton kitchens, up and down the coast, are now modernized with the most advanced type of Madsen gas-fired ranges.

Institutions operating on such a scale as the Leighton Industries have to be right. They cannot afford to guess. Their concentration on Madsen kitchen equipment is an excellent guide for others to follow, whether they are equipping one kitchen or 100.



Leighton's on Market Street Installs Six Madsen Cuisines

MADSEN IRON WORKS, Ltd.

P. O. Box 601, Huntington Park, Calif. (Suburb of Los Angeles)

San Francisco Factory Representative: Fred R. Sanford, 837 Howard St.

Madsen Hotel & Restaurant Kitchen Equipment Sold by Leading Equipment Dealers

The Goodman Stopper

The Reliable Shut-off for Street Mains

Equipped with Improved Patented Locking Sleeve, which locks both handles to the pipe. Stopper cannot slip. Gas cannot pass.

Safety Gas Main Stopper Co.
523 Atlantic Avenue, Brooklyn, N. Y.

Atlanta Gas Light Co. Adds 32,000,000 to Gas Load

The Atlanta Gas Light Co., Atlanta, Ga., subsidiary of Southern Cities Public Service Co., Chicago, Ill., recently completed installation of natural gas equipment for the Battle Hill Sanitarium at Atlanta. The installation consists of one 150- and one 125-H.P. boiler equipped with Webster gas burners and automatic damper control system. The gas consumption of these boilers will be about 30,000,000 per year.

The company also installed three Vulcan hotel ranges, replacing coal equipment, and one Vulcan bake oven with thermostatic control, replacing an electric bake oven. The gas load for this equipment will be about 2,000,000 cubic feet per year.

Sales Wrinkle for Reaching Gas Refrigerator Prospects

Salesmen for the Minneapolis Gas Light Co., Minneapolis, Minn., have recently undertaken a novel plan of securing the names of refrigerator prospects. The salesman takes the addresses of all homes displaying "ice cards" in the windows, consults the city directory to get the names, and sends these prospects the Electrolux Plan "C" broadside with a savings analysis form made out for the average family. Then he telephones for an evening appointment.

A survey of the results indicates that about 50 per cent of these names are good prospects.

Line from Strawn Field to Leon Plant Nearly Completed

Texas Construction Co., of Fort Worth, Texas, is constructing a natural gas transmission line from the Strawn gas field to serve the Leon electric generating station of the Texas Electric Service Co. of Eastland, Texas. The line is an 8-inch, 18-mile extension to the Texas Electric Service Co.'s 7-mile, 10-inch line now in service. Completion of the carrier is expected between March 1 and 15.

Madison Franchise to Northern Gas and Pipe Line Co.

Northern Gas and Pipe Line Co., Omaha, Neb., has been granted a new franchise for the service of natural gas at Madison, Neb. The franchise gives the company until October, 1932, to serve the town. The line to Madison will be constructed from West Point to Beemer, Wisner and Stanton.

Pacific Pipe & Supply Co. Named Jobber for Tube Turns

Announcement is made of the appointment of Pacific Pipe & Supply Co., Los Angeles, as jobber of Tube-Turns, stock fittings for pipe welding.

A complete Tube-Turn stock is carried by Pacific Pipe & Supply Co. and literature is available upon request.

Buck & Stoddard, Inc., is Pacific Coast distributor for Tube-Turns.

1,000,000 c.f. Well May Serve Talihina, Okla.

Bringing in of a new gas well, with an estimated daily capacity of 1,000,000 cubic feet, near Talihina, Okla., has given that town hope that it may have natural gas service soon. John Bailey, who drilled the well, plans to start several others in the vicinity of Talihina.

WITH CLOSED-TOP OR OPEN TOP

Lustrous Beauty

Convenience and Cleanliness In This Charming

WEDGEWOOD

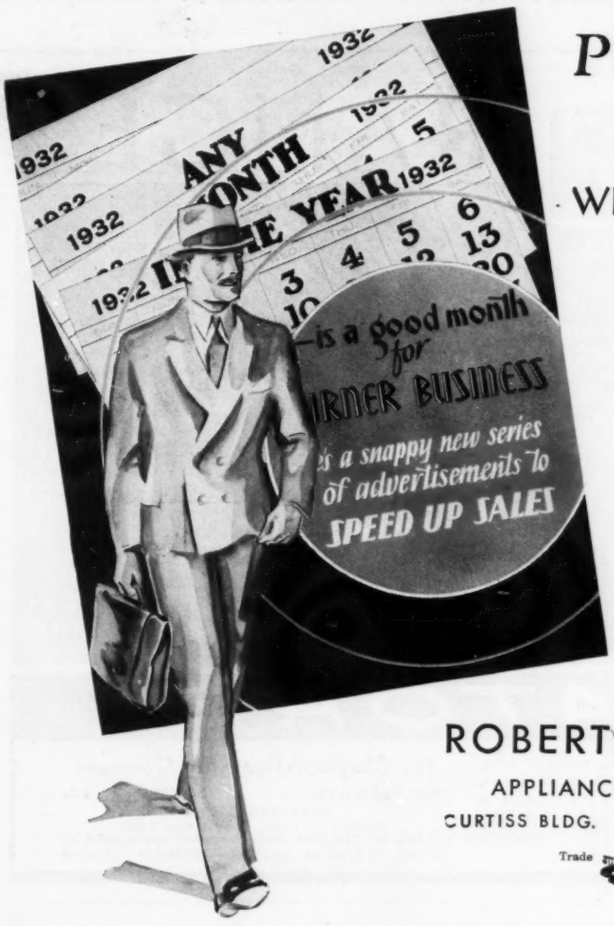
TABLE-TOP

Insulated Oven Gas Range

Wedgewood has achieved another triumph in this beautiful TABLE-TOP GAS RANGE. The finest of its type in America today. All the service of a large-size range and the convenience of an all-porcelain kitchen table. A delightfully pleasing cabinet in appearance, rather than any semblance of a stove. May be had with either closed cooking top or open cooking top under the porcelain table-top. Large 16-inch size insulated oven with porcelain linings and heat control. Three striking finishes to choose from—cool green and ivory, all ivory, or marble.

JAMES GRAHAM MFG. CO.

Largest Stove Manufacturers in the West
A Pioneer That Is Still the Leader
San Francisco, Newark, Calif., Los Angeles



Pave the way for Spring Sales

WITH NEW ROBERTS ADVERTISING

Systematic advertising, coordinated with aggressive sales effort BRINGS RESULTS. Send your sales representatives out this spring with the assured backing of a sustained advertising campaign.

Write for our new sales material. There are at least thirty-five new pieces of literature fresh off the press. Illustrated letters; four-page folders in full color; envelope stuffers to go with your monthly gas bills; blotters; newspaper advertisements, including a clever new comic strip series and a big eight-color window display for your window.

A broadside with complete samples of our advertising literature will be mailed to you on request. Write today.

ROBERTS-GORDON

APPLIANCE CORPORATION

CURTISS BLDG. BUFFALO, N. Y.

Trade Mark

NOW You can offer Spark quality, *plus low price appeal!*

Note these features!

Full porcelain enamel; Buff-tone Ivory background with Forest Green trim; Porcelain enamel lid-top; Concealed, aerated manifold; Extra thick Rock wool insulated oven top and doors; Pendant handles and matching pendant valve handles; Enamel Oven linings; Oven Heat Indicator; Kindler burner in firebox.

Retails for $98.50

Obtainable in Straight Gas & Kitchen Heater models

THE NEW 80 SERIES

SPARK
CONSOLE MODELS

Here's the stove that we predict will be the BEST SELLER of 1932, *regardless of make, model or price.*

A modern stove, to meet EVERY modern demand — *including the demand for low price.* Yet it has the beauty, the "eye-appeal," and proven quality of Spark craftsmanship.

A stove that will cut down your "lost sales" to zero. A stove that fits in with Spark series 50, 60 and 70 to give you a line that will defy competition in EVERY price class.

Write or wire for complete data.

MANUFACTURED BY
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Oakland California

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Portland, 330 Union Avenue, North « » Seattle, 1016 First Avenue, South

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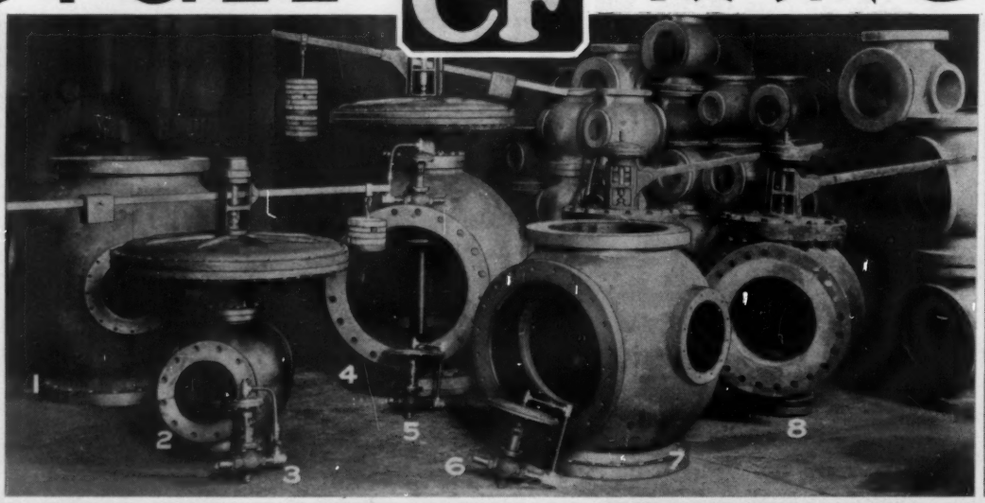
A FULL CF RANGE

1 BODY FOR TWENTY-FOUR-INCH LOW PRESSURE REGULATOR.

2 A TEN-INCH DIFFERENTIAL REGULATOR.

3 A THREE-FOURTHS INCH HIGH PRESSURE REGULATOR.

4 TWENTY-FOUR-INCH DIFFERENTIAL REGULATOR FOR MIXING GASES.



5 ONE-INCH HOUSE REGULATOR.

6 ONE AND ONE-HALF INCH HOUSE REGULATOR.

7 BODY OF A TWENTY-INCH WEIGHTED ILLUMINATING REGULATOR.

8 A SIXTEEN-INCH HIGH PRESSURE REGULATOR.

REGULATORS

Durability and accuracy to such a degree that they command admiration, maintained by unremitting effort for over forty years, have made Fulton Regulators the standard bearers of quality wherever regulators are used on this continent and in many fields abroad. Varying types and sizes have been evolved to meet the growing and altering needs of modern gas control. The same ideals of design, materials and workmanship are embodied in all Chaplin-Fulton products. All are illustrated and described in printed matter, free on request.

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Wholly-owned subsidiary of Standard Gas and Electric Company

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New York Pittsburgh San Francisco

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LIMITED
Pipe Line Construction
ORGANIZATION — EXPERIENCE
RESPONSIBILITY
LOS ANGELES CALIFORNIA

GAS PIPE LINE MAP
Compiled by the Editors of WESTERN GAS—Size 45" x 45"
The most comprehensive published; covers the 22 western states in detail. Gives gas fields, names of natural gas communities; sizes of pipe lines and names of pipe line companies.
Prices: $1.50, Heavy Bond Paper; Printed on Cloth, $3.50
WESTERN GAS
124 West Fourth St. Los Angeles, Calif.

If you would keep in touch with the Natural Gas and Butane industries, send a check for $2.00 to

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Company.....

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Street Address.....

City and State.....

Subscription Rates: 1 Year $2.00; 3 years $5.00;
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SEMI-CHROME
LEATHER

Resists acids
and boiling water.

Now Used in All

SPRAGUE METERS
AND REGULATORS

May we send you
samples and data?

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BRIDGEPORT, CONN.
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Davenport, Iowa Houston, Texas

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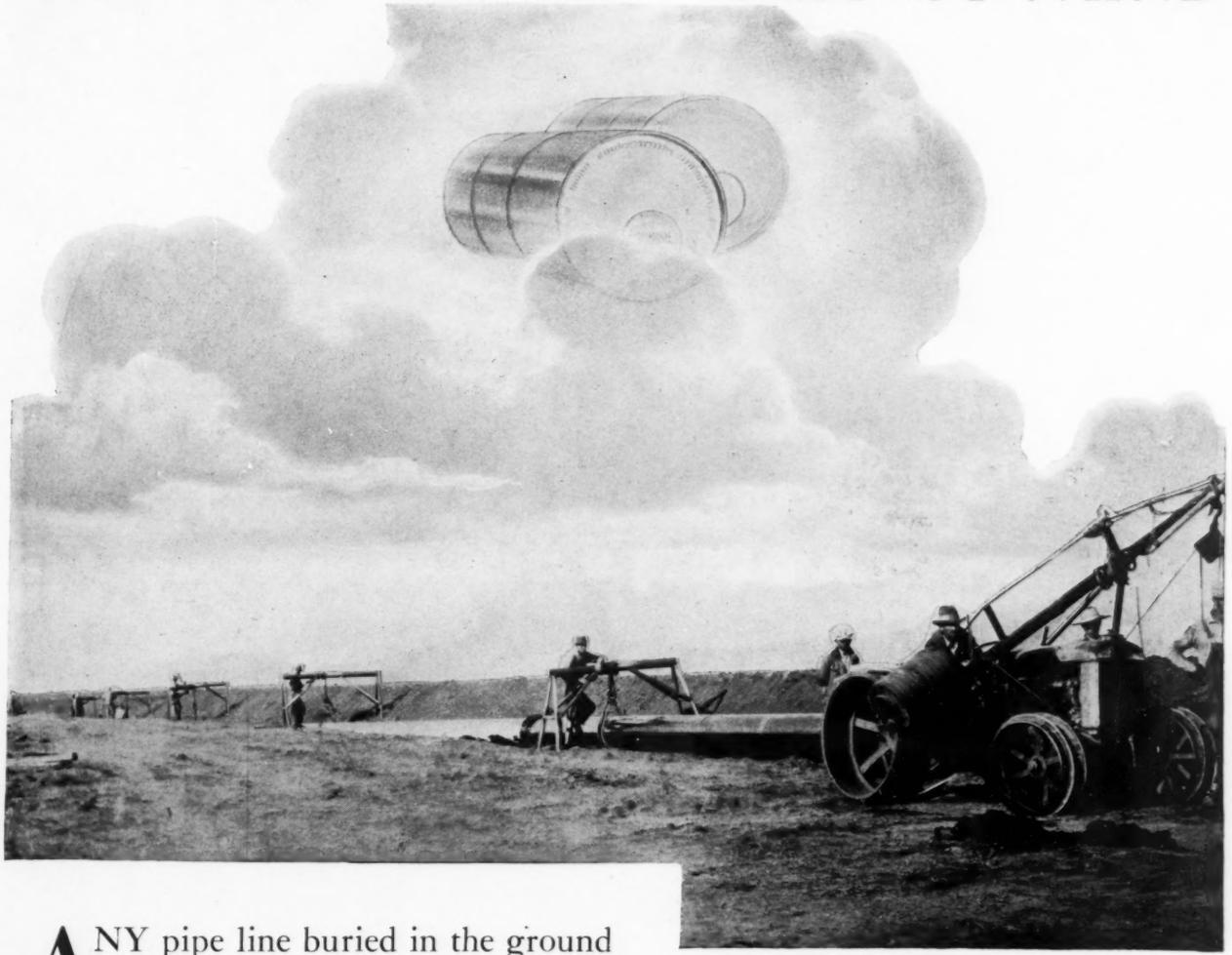
OUT OF SIGHT - OUT OF MIND



ANY pipe line buried in the ground is out of sight. It is gone but, if improperly protected in corrosive soils, it is not so easily forgotten. Engineers for most of the big lines, therefore, have chosen to play safe. They have put their pipe not only out of sight but out of mind by specifying Bitumastic.

BITUMASTIC
REG. U.S. PAT. OFF.

ENAMEL

"Proven Protection for Pipe Lines"

Wailes Dove-Hermiston Corporation

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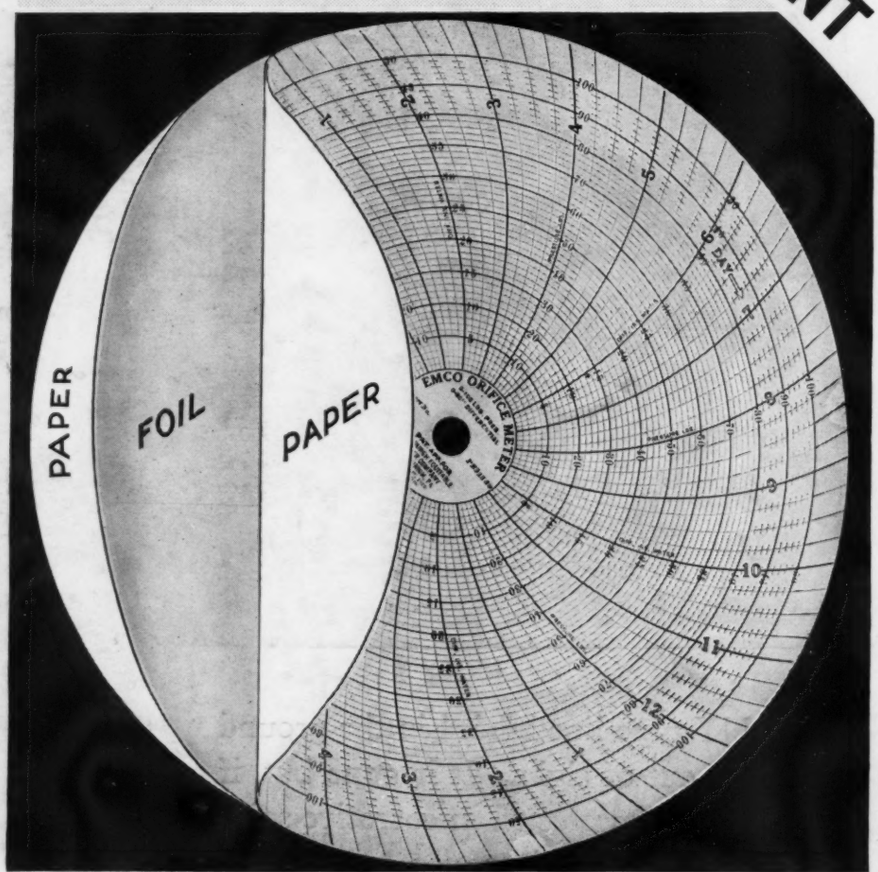
Philadelphia	Cleveland	Tulsa	San Francisco	Los Angeles	Chicago
401 N. Broad St.	Union Trust Bldg.	Philtower Bldg.	345 Vermont Street	2461 E. 8th Street	20 N. Wacker Drive

ALEMCO CHART

ANOTHER EXCLUSIVE EMCO DEVELOPMENT



MOISTURE PROOF—Ordinary chart paper may affect your meter records as much as 2% due to humidity changes—but ALEMCO will not vary one-tenth of that amount. Why destroy the accuracy of the orifice meter by using inferior charts?

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INK will not "feather"—always a clear, sharp line.

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Slightly higher cost is infinitesimal compared to the possible loss of meter revenue.

Again EMCO has solved an important problem for the Gas Industry by producing ALEMCO, an Orifice Meter Chart that reduces effects of changing atmospheric conditions. Write today for full details and samples... ALEMCO is a product of the

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